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SHIP YARDS FILLED UP.

FOUR MORE ORDERS FOR LAKE FREIGHTERS TO COST A QUARTER OF A MILLION EACH—THIRTY-ONE NEW VESSELS, COSTING \$4,174,000, NOW UNDER CONTRACT ON THE GREAT LAKES.

Within the past few days Detroit and Cleveland ship builders have closed contracts for four steel freight steamers, all of the very largest class, 7,000 to 7,500 net tons capacity, and of about \$1,000,000 in aggregate value. The cost of these modern lake freighters is very close to a quarter of a million dollars each. The new contracts are as follows:

Detroit Dry Dock Co.—Two freight steamers for delivery in the fall to parties not as yet named by the builders. Keels for these ships will be laid at once at the Wyandotte yard of the Detroit company. The announcement regarding these orders is contained in a telegram to the Review from Gilbert N. McMillan, secretary of the Dry Dock company.

Cleveland Ship Building Co.—An order from Mr. A. B. Wolvin of Duluth to duplicate the steamer now building by the Cleveland company for Mr. Wolvin and his associates. The steamer will be 432 feet keel, 50 feet beam and 28 feet depth and will have quadruple expansion engines with Babcock & Wilcox water tube boilers.

Globe Iron Works Co., Cleveland—An order from Capt. John Mitchell, representing the Cleveland Steamship Co., to duplicate the steamer M. A. Hanna, now under construction at the works of the Globe company. This steamer will be 416 feet keel, 50 feet beam and 28 feet depth and will have triple expansion engines—23, 37½ and 63 by 42 inches—with three Scotch boilers of 12 by 12½ feet dimensions, allowed 185 pounds steam pressure. Delivery of both this steamer and the Wolvin steamer will be very late, probably October.

These four orders bring the number of new freight carriers under contract on the great lakes up to eighteen. Their aggregate carrying capacity will be about 101,400 net tons on 17 feet draught. The number of vessels of all kinds now under contract in lake ship yards is thirty-one and the aggregate value \$4,174,000. This summary includes the large river passenger steamer, to run between Detroit and Port Huron, for which the Detroit Dry Dock Co. closed a contract only a few days ago. Another contract for a steel barge will very probably be announced within a few days by the Union Dry Dock Co. of Buffalo, and it is understood that the American Steel Barge Co. of West Superior is figuring on an order which they expect to close up shortly; then all the ship yards will be supplied with new work that will last until well along towards the close of navigation next season.

The excursion steamer to be built by the Detroit Dry Dock Co. for the Toledo-Detroit-Port Huron service of the Red Star Line of Detroit, and which is to be finished in the spring of 1900, is a type of vessel worthy of an extended description in these columns, and arrangements will be made later on to secure plans of both hull and engines. At present only a meager description is at hand. The new steamer will be 320 feet long over all, 36 feet beam of hull, 68 feet over guards and 13½ feet moulded depth. Engines will be of inclined triple expansion type and there will be six boilers in two batteries. It is expected that the power will be sufficient to give the vessel a speed of full 20 miles an hour. As the steamer will be in all respects a day boat, it is expected that the capacity in passengers will approach 3,500.

Senator Hanna and his brothers, H. M. Hanna and L. C. Hanna, have been building and operating ships on a very large scale all their lives, but in all the years that they have been associated with shipping the name Hanna has been given to only one vessel, the schooner L. C. Hanna, named for their father. The schooner L. C. Hanna was lost several years ago. The action of the Cleveland Steamship Co. (Mitchell & Co. interest), in naming the new steamer building at the Globe works, Cleveland, in honor of Senator Hanna is entirely appropriate.

Hingston & Son of Buffalo are arranging for the construction of a wooden tug for Hingston & Woods, dredging contractors of the same place. The vessel will be 80 feet long, 20 feet beam and 12 feet depth, and will have a Trout compound engine with cylinders of 14 and 30 inches by 20 inches stroke. The boiler will be built by Farrar & Trefts of Buffalo and will be 8½ by 12 feet, allowed 180 pounds steam pressure.

Quadruple expansion engines for the steamer to be built by the Union Dry Dock Co. of Buffalo for the Western Transit Co. will be furnished by the Cleveland Ship Building Co. Cylinders will be proportioned on a diameter of 23 inches high pressure. There will be four 12½-foot Scotch boilers fitted with Howden hot draft appliances.

Another dividend of \$1 a share has been declared by the Republic Iron Co., operating one of the oldest of the Marquette range properties in the Lake Superior iron ore region. No change was made at the annual meeting in either officers or directors.

Officers of the Richardson Transportation Co. of Cleveland, elected Tuesday, are: President, treasurer and manager, W. C. Richardson; vice president, H. C. Ellison; secretary F. S. Masten; directors, W. C. Richardson, son, H. C. Ellison, C. E. Grover, Capt. Thomas Jones, Louis Hausheer, H. D. Goulder, John Thompson.

The war department has decided to rename the transports Mohawk and Mobile, which were recently refitted. The Mobile will be known as the Sherman and the Mohawk as the Grant.

COPPER REGION OF LAKE SUPERIOR.

COMMERCE OF THE FAMOUS PORTAGE LAKE CANAL DISTRICT—AN AGGREGATE VALUE OF THIRTY-NINE MILLIONS, OF WHICH MORE THAN TWENTY MILLIONS IS IN COPPER.

The estimated value of freight passing through the Portage Lake ship canals during the navigation season of 1898 was \$39,254,415.50. Of this amount \$20,158,080 is represented by the movement of 83,992 net tons of copper. Freight of all kinds aggregated 1,367,685 net tons. A large part of this freight is carried in vessels passing to and from the head of Lake Superior, and while credited to the canals, is not, of course, to be put down as business of the Portage district, as is the great bulk of copper, lumber and coal. In 1897 the freight aggregated 1,020,723 tons, valued at \$34,044,268.85, of which 78,732 tons was copper, valued at \$17,321,040. The entire commerce of the canals as reported to the war department by Major Clinton B. Sears, United States engineer in charge, is shown in the following tables:

COMMERCE OF PORTAGE LAKE SHIP CANALS—SEASONS OF 1895 TO 1898 INCLUSIVE

ITEMS.	Designa-tion.	Seasons.			
		1895	1896	1897	1898
Steam vessels.....	Number ..	2,972	3,068	2,517	3,282
Sail vessels.....	" 476	500	414	627	
Tonnage, registered.....	Net tons ..	1,013,660	1,076,548	1,025,375	1,447,216
Passengers	Number ..	24,809	41,262	34,942	30,405
Coal	Net tons ..	829,246	398,961	438,604	619,009
Flour.....	Barrels ..	850,095	774,143	450,712	467,215
Wheat.....	Bushels ..	261,210	225,430	60,000	143,000
Grain (not wheat).....	" 67,345	100,533	4,000	56,225	
Salt.....	Barrels ..	45,028	99,813	136,270	68,763
Copper.....	Net tons ..	69,904	74,473	78,732	83,062
Iron Ore.....	" "	17,930	16,755	4,949	15,529
Pig Iron.....	" "	7,047	8,082	3,330	8,597
Manufactured iron.....	" "	17,890	14,172	10,436	24,002
Lumber.....	M.ft.B.M.	86,235	103,504	99,113	155,395
Logs.....	" "	31,717	39,115	26,250	18,051
Building stone.....	Net tons ..	10,060	14,674	17,482	63,663
Miscellaneous mdse.....	" "	147,174	127,447	174,629	190,650
Total freight.....	" "	923,756	1,041,983	1,020,723	1,367,685

ESTIMATED VALUE OF FREIGHT PASSING THROUGH PORTAGE LAKE SHIP CANALS DURING THE SEASON OF 1898.

ITEMS.	Designa-tion.	Quan-tities.	Price per Unit.	Valua-tion.
Coal (Anthracite).....	Net tons ..	28,980	\$4.75	\$ 137,417.50
" (Bituminous).....	Net tons ..	590,079	2.50	1,475,197.50
Flour.....	Barrels ..	467,215	4.00	1,868,860.00
Wheat.....	Bushels ..	143,000	.80	114,400.00
Grain (other than wheat).....	" 56,225	.50	28,112.50	
Manufactured iron.....	Net tons ..	24,092	50.00	1,204,600.00
" "	" 8,597	13.50	116,059.50	
Pig iron.....	" 15,529	3.25	50,460.25	
Iron ore.....	Barrels ..	68,703	.75	51,527.25
Salt.....	Net tons ..	83,902	240.00	20,158,080.00
Copper.....	M.ft.B.M.	155,395	14.00	2,175,530.00
Lumber.....	" 18,051	10.00	180,510.00	
Logs.....	Net tons ..	63,663	4.00	254,652.00
Building Stone.....	" "	190,650	60.00	11,439,000.00
Unclassified freight.....				\$39,254,415.50
Total				

PROPOSED NEW GRAIN BILL OF LADING.

Mr. A. B. Wolvin of Duluth has positively refused to allow his name to be presented for the presidency of the Lake Carriers' Association. Mr. H. A. Hawgood of Cleveland, and Mr. C. W. Elphicke of Chicago are now among members spoken of for the place. There will probably be little difficulty in settling the Buffalo grain shoveling contract. It is understood that Messrs. Kennedy and Connors will submit a joint bid. The principal question will probably be the adoption of a new form of bill of lading for the grain trade. It is thought that a bill of lading requiring the consignee to provide an elevator within twenty-four hours after arrival of the ship, or pay demurrage in proportion to the freight, can be made operative if the vessel owners act as a unit in the matter. Secretary Keep has been collecting information regarding the operation of the present bill of lading, and hopes to present a statement showing overruns and shortages on grain cargoes handled during the past season; also the various cases in which vessels had more than one consignment of grain in a single cargo, extra towing charges at the port of Buffalo caused by unloading vessels at more than one elevator, etc.

Stanley C. Vansant of Atlantic City, N. J., will have considerable new work out by spring. Included in the boats which will be ready by that time will be a 35-foot, \$800 catboat for Capt. Walter Somers of Atlantic City, N. J.; 39-foot, \$900 catboat for Capt. N. N. Parker of Atlantic City, N. J.; 40-foot, \$1,000 knockabout for the Bay View Yacht Club of Longport, N. J., and a 25-foot, \$300 gig for the schooner yacht Columbia. Extensive alterations are being made to the sloop J. W. Morgan, owned by P. W. Verga of Philadelphia, and to the sloop yacht St. Charles, owned by Capt. E. A. Parker, Atlantic City, N. J. The expense of alterations in the first case will be about \$600 and in the second case \$500. The schooner yacht Outing, owned by William Marks of Philadelphia, is being altered to an auxiliary yacht at a cost of about \$1,200.

Louis Daniels, Vergennes, Vt., is building a schooner 66 feet over all, 11 feet beam and 6 feet depth. White oak is the material used.

SUCCESSFUL TRIAL.

TORPEDO BOAT ROWAN, BUILT BY THE MORAN BROS. CO., OF SEATTLE, WASH., EXCEEDS HER CONTRACT SPEED OF 26 KNOTS AND MEETS ALL REQUIREMENTS.

There are but three ship building concerns on the Pacific coast engaged upon contracts for the United States government and during the past four months a torpedo boat built by each of these firms has on the occasion of its governmental trial exceeded the speed stipulated in the contract. The torpedo boat Farragut, built by the Union Iron Works, San Francisco, and the Davis, built by the Wolff & Zwicker Iron Works, Portland, Ore., were the first to exceed contract stipulations as to speed, and now comes the Rowan, built by the Moran Bros. Co. of Seattle, Wash., with a record quite as creditable.

The U. S. S. Rowan is a torpedo boat of the first class, built in accordance with the general design of the navy department. The principal dimensions of the hull are: Length, 170 feet; breadth, 17 feet; normal displacement about 182 tons. There are two propelling engines of the vertical, inverted-cylinder direct-acting, triple-expansion type, each having four cylinders of 14½, 23, 25¾ and 25¾ inches diameter respectively, the stroke of all pistons being 18 inches. The combined indicated horse power of the main engines is 3,200. The propeller wheels are 6 feet in diameter and the pitch of the screw is 9 feet.

There are three boilers of the water tube type, each operated under the closed stoke hole forced draft system. The draft is supplied by three special blowers with independent compound engines, especially designed and built for this work by the Moran Bros. Co. The vessel is equipped with a very complete electrical system, including electric lights, a steam steering engine, steam windlass, air compressor and the usual pumps. The vessel is to be manned by a crew of twenty-four men, including four officers. The armament consists of four rapid-fire guns of small calibre and three torpedo tubes.

The Rowan left her moorings at the works of the company at 10:20 A. M., Jan. 6, and proceeded at a low speed to the middle of Puget sound, off Alki Point, and proceeded thence northwardly in a straight course ending in the Strait of Juan De Fuca at full speed. The official run began at 10:55 o'clock A. M., and lasted two consecutive hours, ending at 12:55 o'clock, P. M. The vessel was then turned and headed southward, passing Port Townsend at 2 o'clock P. M., and arrived at the works of Moran Bros. Co. at Seattle, at 4 P. M. During the return trip the average speed maintained was about 21 knots.

The weather was cold, snow falling lightly during the entire trip. Very little vibration took place in the hull, even when at the highest speed of over 28 knots, and this absence of vibration in the hull of the vessel was pronounced by the members of the trial board as a remarkably good point for a boat of her class. The performance of the machinery was highly satisfactory throughout, and the forced draft blowers were not run at their maximum speed, it being found during the trip that an air pressure of only 4½ inches of water was required for sufficient combustion.

The following tables are compiled from notes taken during the trip by the company's representative:

COUNTER READINGS.

Time.	Port engine.	Starboard engine.
10:55	6,360	12,030
11:10	11,885	17,780
11:25	17,205	23,390
11:40	22,820	29,330
11:55	28,260	35,020
12:10	33,590	40,650
12:25	38,840	46,160
12:40	43,990	51,590
12:55	49,460	57,380

Total revolution of port engines during official run, 43,100; starboard engine, 45,350; average revolutions per minute, port engine, 359.1; starboard engine, 377.9; average revolutions per minute, both engines, 368½; average pitch of propeller wheels, 9.486 feet; theoretical slip as allowed by the bureau of steam engineering, 21.4 per cent; efficiency of wheels, 78.6 per cent; actual speed of vessel as determined by above=9.486×368.5×.786×60÷6,080.27=27.2 knots.

During the entire trip the main throttle valves were wide open, and the steam pressure, while on the official run, as shown by the engine room gauges, varied from 250 to 225 pounds. The average vacuum maintained was 27 inches. The required contract speed of the vessel being only 26 knots per hour, it is needless to state that the trip was highly successful.

BATTLESHIPS NEARING COMPLETION.

It is now announced that the battleships Kearsarge and Kentucky, building by the Newport News Ship Building & Dry Dock Co., Newport News, Va., will be ready to go into commission with all guns aboard by July 1, or six months before the expiration of the time limit. Portions of the mounts for the 13-inch guns have already arrived at the yard. Under the original contract the battleships were to have been turned over to the government this month, but delays imposed by the navy department, armor manufacturers, etc., made it necessary to advance the limitation for completion one year. The company will require only half of this however. The machinery departments in both vessels are 95 per cent completed and the hulls are 85 per cent completed. It is essential that most of the armament be in position before the battleships leave Newport News, in view of the fact that inasmuch as the turrets for the 8-inch guns are to be placed on top of those for the 13-inch guns it will be necessary to first place the larger guns in position and build the turrets over them.

Insurance men of the great lakes who have been in the east recently say that the question of insurance for another season is still decidedly unsettled. The principals of New York, Boston and other eastern insurance centers are no more certain of the policy to be pursued on the lakes than are the agents of Chicago and Buffalo, but they all talk of a contract less favorable to the vessel owner and of somewhat higher rates. The scheme proposed by C. A. Macdonald of Chicago has been practically given up, and it would seem that the lake business will again be controlled next season by the McCurdy-Prime syndicate of Chicago and by the Johnson & Higgins-Smith, Davis & Co. combination of Buffalo.

TESTS OF BABCOCK & WILCOX BOILERS.

Marine engineers will be interested in a couple of remarkable tests of Babcock & Wilcox boilers recently completed in England. One of the trials was that made with boilers of the British torpedo gunboat Sheldrake. The basin trials of this vessel took place at Devonport, and the sea trials were carried out off Plymouth. There are four B. & W. boilers in this ship, having a collective heating surface of 9,424 square feet and a total grate area of 252 square feet; 4,050 I. H. P. was obtained on the sea trials when burning about 25 pounds of coal per square foot of grate per hour with ½ inch air pressure in the ash pits. With this power the vessel attained a speed of 20.6 knots per hour on a coal consumption of 1.57 pounds per I. H. P. per hour. When burning only 15 pounds of coal per square foot of grate per hour, the average I. H. P. was 2,642; the speed obtained with this power was 17.9 knots per hour, and the coal consumed per I. H. P. per hour was 1.42 pounds.

The Messrs. Wilson of Hull, England, lately completed the trials of the steamer Truro, which is the seventh vessel of their line fitted with Babcock & Wilcox boilers. The following is the engineer's report of these trials: The coal used was Scotch. The consumption calculations are made on the average I. H. P. The feed-water remained perfectly steady all day. No priming was observed. A satisfactory accumulation trial was made during the day. No flaming was observed at the funnel mouth. The adjustable baffles were regulated to obtain the best combustion with the least amount of smoke, the best results being obtained when the ratio of baffle opening to grate area was as 1 to 12.

Total heating surface, 5,500 square feet; total grate area, 117 square feet; ratio of heating surface to grate area, 47:1; baffle opening, 9.75; ratio of baffle opening to grate area, 1:12; average pounds of coal per hour, 2,100 pounds; average pounds ash per hour, 100 pounds; average pounds combustible per hour, 2,000 pounds; maximum I. H. P., 1,564; average I. H. P., 1,415; pounds of coal per I. H. P. per hour, 1.48; pounds combustible per I. H. P. per hour, 1.41; pounds coal per square foot of grate, 18; average funnel temperature, 600 degrees; average speed in knots, 13.8; average revolutions, 110; temperature of feed-water, 145 degrees; pressure of steam in boiler, 225 pounds; pressure of steam in H. P. casing, 220 pounds; pressure of steam in I. M. P. casing, 96 pounds; pressure of steam in L. P. casing, 20 pounds, vacuum 24 inches; percentage of ash, 5.

The Babcock & Wilcox Co., in England, has just installed eight boilers in a large dredger for the Russian government, and two boilers for the corvette Ellida. The steamer Turret Cape has been working very satisfactorily with these boilers. Her consumption of coal has been 15½ tons per day, her deadweight 3,121 tons, her speed is from 9 knots to 10 knots, and the I. H. P. 830.

DEEPER CHANNEL FOR THE DELAWARE.

Ship builders on the Delaware river are co-operating most actively in the effort to impress the committee on rivers and harbors of the House of Representatives with the necessity for the deepening of the channel of that river. In a memorial which has been presented to the committee, the importance of a deep-water channel between the sea and the League Island navy yard is discussed at considerable length, and the peculiar advantages which League Island possesses as a naval station are set forth. It is further set forth that the ship yards of the Delaware river at Wilmington, Chester, Camden and Philadelphia, being in close proximity to the coal, iron and steel centers of the country, only await such encouragement as the national government can give to become the Clyde of America. It is pointed out that the 30-foot channel proposed would entirely obviate most of the difficulties under which the ship builders have labored.

TRIGG COMPANY BEGINS WORK.

The William R. Trigg Co. of Richmond, Va., have brought their new plant to a sufficient degree of completion to begin work upon the United States torpedo boats Stockton and Shubrick, the frames of which are already in position. Work upon these boats will be pushed, and it is anticipated that they will be ready for launching by the middle of June. Work on the machinery is progressing very satisfactorily. There is ample room underneath the immense sheds which have been erected for the other vessels, and the keels will be laid in a few days. Supt. Nelson states that he believes that all five boats will be under way within two weeks. Work upon the destroyers will not, however, be hurried until the torpedo boats are well under way, as the latter must be completed by Nov. 16 next, whereas six months longer is allowed for the destroyers.

SOCIETY OF NAVAL ENGINEERS.

The eleventh annual meeting of the American Society of Naval Engineers was held in the rooms of the engineer-in-chief of the navy at Washington last week, and the following officers were elected for the current year: President, Chief Engr. Harry Webster, U. S. N.; secretary-treasurer, Chief Eng. A. B. Willits, U. S. N.; council, P. A. Eng. C. A. E. King, U. S. N.; P. A. Engr. W. W. White, U. S. N.; P. A. Engr. E. Theiss, U. S. N. Among other business transacted was the formulation of plans to increase the value of the journal of the society for the future, and a modification of the plan hitherto pursued for the prize essay competition. The best original article published in the journal during the year will receive the prize, its value to be decided by a vote of the entire society. The financial condition of the society is satisfactory.

One of the handsomest as well as most striking calenders sent out this season is that distributed to the patrons of David Kahnweiler's Sons, New York, under which name the business of manufacturing life preservers, life rafts and boats established by the late David Kahnweiler will henceforth be carried on.

The United States cruiser Albany, a sister ship of the New Orleans, and which was purchased unfinished from the Brazilian government shortly before the outbreak of the Spanish-American war, was launched at the Armstrong yard at Newcastle, Eng., last Saturday.

The two ironclads for the construction of which the Norwegian government invited bids from ship builders all over the world, will be built at the yard of Sir W. G. Armstrong, Whitworth & Co., Newcastle, Eng.

FRENCH MERCHANT MARINE AND SHIP BUILDING.

Mr. John C. Covert, United States consul at Lyons, France, has just transmitted to the state department at Washington a voluminous but very interesting report upon the merchant marine of France and the status of the ship building industry in that nation. He says in part:

"Something over a year ago, an extraparliamentary commission was appointed to study and report upon the present condition of the French commercial marine and to recommend legislation. The report of the commission may be expected early in 1899. The discussions as printed in the *Moniteur Maritime*, cover 149 quarto pages. I have read them very carefully and condense in this report many points which may be found useful to people interested in this subject in the United States. Most of the ship yards of France are occupied with repair work, and build only ships of small tonnage; some build only dredges and small craft for coasting. For the building of large merchant ships, there are yards in France as follows: Those of the *Messageries Maritimes*, which do work only on their own ships; those of the *Compagnie Générale Transatlantique* at St. Nazaire, which work chiefly on its own steamers, and have thus far built only one war ship and one sailing ship; at Bordeaux, the ship yards of the Gironde, which seem disposed to make a specialty of war ships; at Nancy, a yard which builds sailing ships of a maximum of 3,000 tons and small steamships; at Paris and in the department of the Seine and at Lyons yards which appear to confine themselves to special work and are not disposed to embark in the construction of large merchant ships; at Rouen, the ship yards of Normandy, which have been established since 1893, and at which one steamship and a number of sailing vessels have been built during the past few years; added to these are the two large ship building companies, the *Forge* ship yards of the Mediterranean, and the shops and yards of the Loire, each of which owns two important navy yards, and which are also the principal builders of merchant ships in France.

The following is a statement from Mr. Covert of the number of ships of war built for France and foreign countries in the French ship yards from 1878 to 1896 inclusive:

YEARS.	Ships of War.		Merchant Ships.	
	Displacement.	Horse-Power.	Displacement.	Horse-Power.
1878-1880.....	Tons. 10,541	18,590	Tons. 8,562
1881-1892.....	15,194	44,243	29,289	9,645
1893-1896.....	19,192	79,310	25,985	7,050

GENERAL TOTAL DURING THE PERIOD FROM 1878 TO 1896.

DESCRIPTION.	Tonnage.	Horse-Power.
Ships of war.....	290,722	903,960
Merchant ships.....	481,095	143,950

"The report of the commission," says Mr. Covert, "is to the effect that the subsidies granted by the law of 1893 caused only a temporary activity in ship building. France, since that time, has produced but four steamers of 13,313 tons burden. The reason for this, or rather the two reasons for it, according to the ship owners, are, in the first place, the high cost of French ships—from 50 to 60 per cent more than English; second, the slowness in building and delivering them. The English, Germans, and Americans never fail, it is asserted, to aid in various ways their merchant marine. In addition to official subsidies, more or less disguised, there exist, in England especially, and in all the English possessions, port corporations and syndicates of ship owners, a system of co-operation and discrimination, the object of which is to protect British maritime commerce against all foreign competition, by skillful and timely changes of rates and the remission of freight altogether to their own countrymen, or sometimes to foreign houses with whom it is of temporary importance to be conciliatory. A study of comparative statistics of the commercial marine of various years for the past ten years shows that in Great Britain there was an increase of 33 per cent; in Germany, 107 per cent; Spain, 30 per cent; Italy, 68 per cent; Holland, 57 per cent; in France, a loss of 1 per cent. The ports of France should be improved, subsidies continued for ten years, canals improved and new ones opened."

The French minister of commercial marine recently published an interesting statement of the sums given by France in subsidies to merchant vessels under the law of 1893 for a period of fifty-nine months. It contains 350 quarto pages and is composed entirely of tables of figures. The names of the vessels subsidized, the number of miles navigated by each, the tonnage and the amount paid are stated. The following are some of the items condensed from this report: One hundred and seventy-two steamships, making long voyages with an aggregate tonnage of 467,726 tons, received subsidies amounting to \$6,200,000; 314 steamships, engaged in coasting trade (between Atlantic and Mediterranean ports), with an aggregate tonnage of 644,986 tons, received \$1,450,954.41; 330 sailing ships, long voyages, with an aggregate tonnage of 204,187 tons, received \$2,095,505.45; 289 sailing ships in the coasting trade, aggregate tonnage of 149,955 tons, received \$38,322.18. The French commercial marine which enjoyed the benefits of this bounty consisted, at the end of 1897, of 396 wooden ships, 445 iron, and 125 steel, among which the steamships carry 784,400 tons, and the sailing ships, 264,309 tons. Some of the trans-Atlantic steamers received as much as \$115,300. The smallest sum accorded—to a sailing ship—was \$2.58.

The steamer S. T. Morgan, built by the Harlan & Hollingsworth Co. of Wilmington, Del., and which was described in the last issue of the Review, is classed by the United States Standard Register of 16 and 18 Exchange Place, New York, and was built under the personal superintendence of Sinclair Stuart, surveyor for the association which publishes this register.

Capt. Pringle, vessel owner, has rented offices and secured dock privileges, and will establish at Ashland, Wis., next spring a complete wrecking outfit.

SHIPPING MEN HEARD.

The house committee on merchant marine and fisheries accorded a hearing a few days ago to a number of gentlemen prominently identified with the construction and operation of ships, who appeared in advocacy of the Hanna-Payne bill. The presentation in favor of the bill was opened by ex-Senator Edmunds of Vermont, who was ably seconded by the commissioner of navigation and by representatives of the shipping interests that have been consulted in framing the measure.

Representative Handy of Delaware, author of the pending "free ship" bill, questioned Mr. Edmunds, Mr. Griscom and Mr. Chamberlain on various shipping questions. Mr. Griscom said, in response to inquiries, that the basis of the present bill was to equalize the extra cost of producing and operating an American ship as against the producing and operating of the foreign ship. To another question, he replied that his line was receiving \$750,000 annually under the present law for maintaining regular mail service under the American flag.

Mr. Handy asked if the lines of foreign ships operated by the Standard Oil Co. would get the proposed subsidy under the pending bill. Mr. Chamberlain, commissioner of navigation, said the measure was so framed as to leave out these ships. President Kimball of the Norfolk & Western Railroad Co. stated that if this bill was passed, his company expected to establish a new line of steamers to South American ports. Mr. Griscom said his company was \$60,000 worse off by running the New York, Paris, St. Paul and St. Louis under the American flag than it would be if the ships were under the British flag.

F. J. Firth, representing the Lake Carriers' Association, said that his people did not care to have the bill apply to them, but that if ocean steamers built and owned in this country were carrying this trade, the whole country would be benefited and the lake vessels would get their share.

Mr. Chamberlain of the bureau of navigation, treasury department, said that the Red D line running between this country and South America, the only one flying the American flag in those waters, would lose money if it had to give up its mail contract to accept a subsidy.

Mr. Sewall of Maine said he did not wish to have the bill regarded as a benefit for the ship builder and owner, but as a national benefit. We had all the elements to take the trade, he said: we had the supplies, but the trade was in the hands of others and we would have to spend money to secure it. It belittled the matter to go into figures in regard to the question. It should be a national question. It was absolutely necessary to preserve this country, to have a merchant marine. This was the first time, he said, that all the shipping interests had come together, and they now agreed that the bill under consideration was the only thing that would save the merchant marine.

Mr. Handy of the committee expressed the belief that the American people would not very long agree to pay subsidies. Any subsidy paid to the steamships, replied Mr. Sewall, would soon be brought back to the country at large by those ships. The subsidy would about amount to the pay roll of the ship; the vessel, however, could not sail a rod unless she carried a cargo; that cargo would be composed of American goods.

GERMAN SHIPPING SUBSIDY.

The prominence given to the discussion of subsidies as a means to foster the United States merchant marine by reason of the introduction in congress of the Hanna-Payne bills lends interest to a recent subsidy agreement made by the German government, by which it proposes to pay more than \$1,000,000 a year for a fifteen-year term for the establishment of steamship lines to ply between its ports and those of Japan, China and Australasia and certain ports of Oceanica. A copy of the contract between the German government and the Lloyd steamship line for the establishment and maintenance of postal and commercial communication between Germany and eastern Asia and Australasia has reached the treasury bureau of statistics. It shows that the Lloyd company agrees to maintain for a space of fifteen years, steamship lines running from Bremerhaven or Hamburg, Germany, by way of a Belgian or Dutch port through Genoa, Naples, Port Said, Suez, Aden, Colombo, Singapore and Hongkong to Shanghai, China, and back by the same route; a second main line through the same ports to Yokohama, Japan; also a main line through the same ports to Adelaide, Melbourne and Sidney, Australia; also branch lines from Hongkong to Shanghai and from Singapore to German New Guinea, and other ports in Oceanica.

Four steamers are, under this contract, to be built for the Chinese and Japanese service, to be of not less than 6,000 tons and equal to those of foreign nations in every respect, their plans to be approved by the admiralty, and to be running respectively by Oct. 1, 1899, Jan. 1, Sept. 1, and Nov. 1, 1900. The steamers to be constructed for the Australian line are to be not less than 5,300 tons, and also equal to those of foreign nations in every respect and subject to the approval of the admiralty. All the ships are to be built in German yards, and German material is to be used as far as possible, all admiralty requirements to be carried out in them, putting them into condition in which they can readily be utilized for war purposes when necessary. The agreement provides that in cases of mobilizing the fleet, the chancellor can purchase the vessels on full payment of their value, or can hire them. The terms of the contract also provide that only German coal is to be taken on board at German, Belgian or Dutch ports of call, except by the special assent of the imperial chancellor; that in cases of German and foreign goods being simultaneously offered for dispatch, the German goods are, if necessary, to have the preference, and that the chancellor may prohibit the importation by German, Belgian or Dutch ports of such agricultural products as may compete with those of German agriculture.

The British battleship Irresistible, recently launched at Chatham, is a sister of the Formidable, launched a short time ago at Portsmouth, and the Implacable, now building at Davenport, the type ranking as the most powerful battleships yet launched. The vessels are 430 feet over all, 75 feet beam and of 15,000 tons displacement.

The business of manufacturing marine lamps, oil and electric signal lights, cabin lamps, etc., heretofore conducted by William Porter's Sons at 271 Pearl street, New York, will hereafter be conducted by a stock company bearing the name William Porter's Sons Co.

LAUNCH OF THE OCEANIC.

LARGEST VESSEL EVER BUILT SLIDES INTO THE WATER AT THE YARD OF HARLAND & WOLFF AT BELFAST, IRELAND—BUILDERS OF THE GREAT WHITE STAR LINER FURNISH THE REVIEW WITH THE FIRST FULL DETAILS PRINTED IN AMERICA REGARDING THIS STEAMSHIP—NOVEL METHOD OF LAUNCHING.

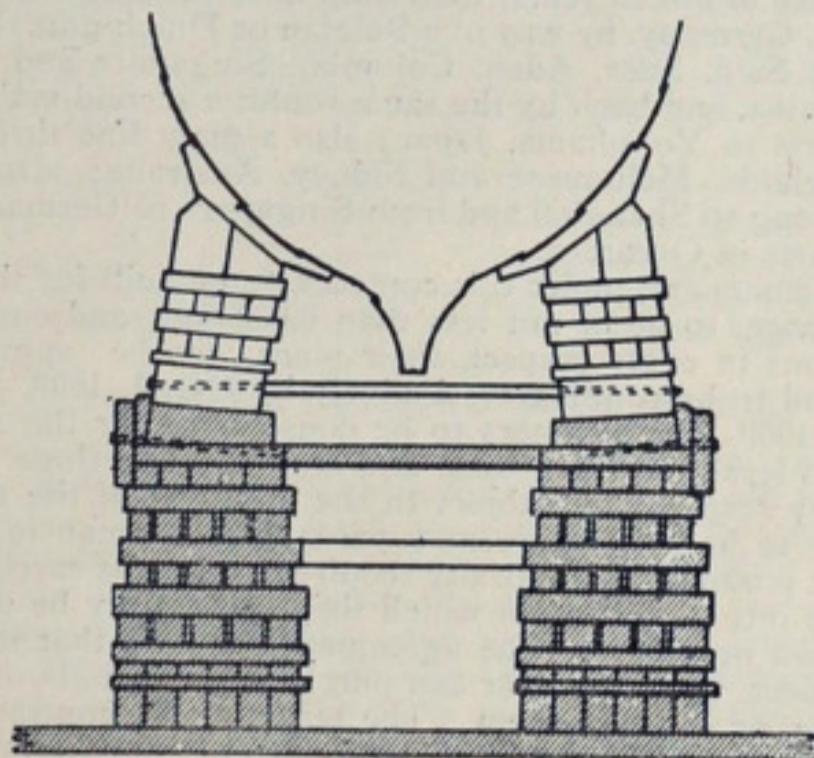
An epoch in the history of ship building is marked by the launch last Saturday, Jan. 14, at the yard of Harland & Wolff at Queen's island, Belfast, Ireland, of the White Star liner Oceanic, the largest vessel ever built. It would be manifestly absurd to predict that the steamship put into the water last week represents the attainment of maximum dimensions in vessel construction, but it nevertheless quite as uncontroversially marks an epoch, by reason of the fact that it is the first hull which has surpassed in length that of the famous Great Eastern. The failure of that vessel resulted in a revulsion against increase in the dimensions of vessels which it was thought for a time would prove permanent, but this, of course, disappeared, the problem was worked out on new lines, and now we have in the Oceanic the first vessel that has reached and passed the dimensions of its unfortunate predecessor.

So little has been printed descriptive of this vessel, and there has been so much secrecy, real or fancied, regarding it, that especial interest attaches to information now submitted to the Review by the builders. Harland & Wolff, in this connection, send to their American friends the following message: "The event is one of which Ireland may feel justly proud, and in which our cousins on the other side of the Atlantic must cordially sympathize with her. To have turned out the 'greatest thing on earth' of its kind, especially when it embodies commercial enterprise carried almost to the point of intrepidity, seizing instant advantage of the phenomenal progress quite recently made in mechanical engineering, is an achievement after a true American's own heart. And if the happy outburst of reviving kinship, in which we all rejoice, had not yet come to pass, and if, instead of bridging the North Atlantic and connecting England and Ireland with the United States, the mission of the Oceanic was to bridge other seas; yet were it only on account of American fraternity with what, in a world-wide sense, is bold and great and commanding, it was fitting that their flag should be, on this occasion, joined with the Union Jack in supporting the familiar ensign of the White Star Line. Thus, for every reason the stars and stripes floated aloft on the huge gantry that has played no insignificant part in the erection of the colossal structure of steel, which, having no further need of the resistless force the gantry provides, glided from under it on Saturday."

Needless to say, the Oceanic has been built to meet admiralty requirements as an armed cruiser, with fitted gun platforms, and exceptional staying power which would enable her to steam 23,400 knots at 12 knots an hour, or in other words more than right round the world without re-coaling, and this without trenching upon the space needed for the accommodation of a large body of troops, stores and ammunition.

COMPARED WITH THE GREAT EASTERN.

It may be thought that Brunel's unfortunate attempt, the famous Great Eastern, has been lost sight of in some of the claims made for the Oceanic, but facts and figures show that, not only is the Oceanic longer than her bulky predecessor, and owing to modern science her superior beyond compare in countless features, but that on the points of weight



SECTION OF LAUNCHING WAYS NEAR THE BOW. THE SHADED PART REMAINED STANDING; THE UPPER PART WAS CARRIED AWAY WITH THE SHIP.

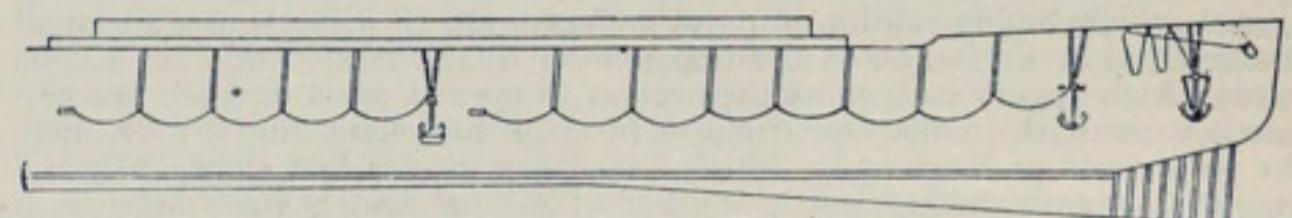
and strength she surpasses the Great Eastern to a degree difficult to define, seeing that in Brunel's day it would have been impossible to construct a ship of equal strength.

The length of the Great Eastern over all was 695 feet 6 inches, that of the Oceanic is 704 feet. The former's draught (light) was 15 feet 6 inches, the latter's is 22 feet. Their respective displacements are 11,844 tons and 18,000 tons, and weight of hull 10,000 tons and 12,500 tons. When voyaging it is estimated the Oceanic will weigh 28,500 tons as compared with the Great Eastern's 25,000. To compare their engines would be almost absurd, the past leviathan with its steam pressure of 25 pounds to the square inch against the Oceanic's 192 pounds. It is a well known fact that the hull of the Great Eastern was of excellent material and very strong, it may therefore be realized how far the determination to make the Oceanic staunch has been carried.

The Oceanic's length over all is 704 feet, her extreme breadth 68 feet

4½ inches, and depth 49 feet. A double bottom 5 feet 1 inch deep extends the full length of the ship and is increased in depth under the engines; and nine longitudinal webs extend through this double bottom. The frames or ribs are of channel steel 9 inches deep, with 4 inch and 4½ inch flanges, and are only 31½ inches apart. The shell plates used in the construction of the hull number about 17,000, the majority in the midship portion of the vessel being over 28 feet long, about 4 feet 6 inches wide, from an inch to 13/8 inches in thickness, and from 2 tons to 3½ tons in weight. The Great Eastern, it will be remembered, had 30,000 plates, for the most part only 10 feet long by 2 feet 9 inches wide, and weighing only 825 pounds. It is also interesting to note that, notwithstanding their much greater strength and weight and the smaller number of plates, over 1,704,000 rivets have been used in the Oceanic, as against 2,000,000 in the Great Eastern. The stern-post, including the arms for carrying the stern tubes, weighs 98 tons. There are in all five steel decks, thirteen watertight bulkheads, about 49 feet apart, and a longitudinal bulkhead 97 feet long extends throughout the engine room.

Special mention has been made of the gantry at the Harland & Wolff ship yard. Its chief work has been to secure the larger number of

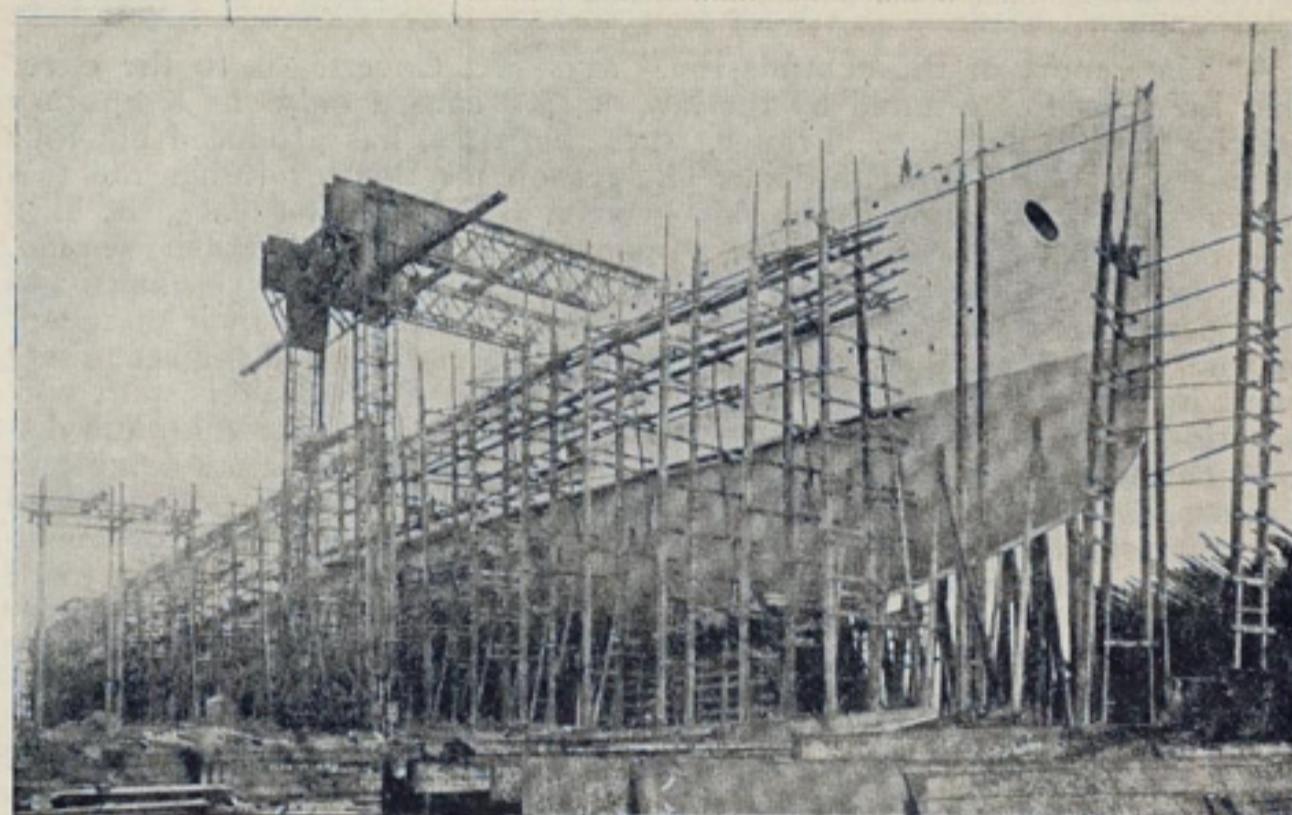


ARRANGEMENT OF ANCHORS AT THE LAUNCHING.

1,704,000 steel rivets just mentioned. The usual proceeding is to drive home by hand the rivet while it is at a white heat, in the facing holes punched in the plates. In the case of the Oceanic, however, electric drills and hydraulic riveting machines were used wherever there will be great strain.

The engines and speed of the Oceanic have been the subject of some absurd reports despite the announcement made at the time the contract was let that "although a much higher speed at sea than is now contemplated (in the Oceanic) is quite practicable from an engineering point of view, it has been determined, as far as possible, to aim at a regular Wednesday morning arrival both in New York and Liverpool." Engines will be triple expansion, twin-screw, each having four cylinders, and the working pressure of the boilers will be 192 pounds.

In appearance the Oceanic will be the very antithesis of the Great Eastern, so much so that the word "leviathan," which implies a certain ponderousness, strikes one as out of place in connection with her. Owing to the Great Eastern's great height above the water line, and her enormous paddle boxes, she looked more than her size; the Oceanic on the other hand, with her fine lines and capacious waist below the water, will probably not look hers. And what will further tend to graceful appearance and a diminution of the effect of mere bulk will be the exceptionally



SIDE VIEW OF THE OCEANIC ON THE STOCKS, SHOWING GANTRY, WITH CONSTRUCTION STAGES REMOVED AND COMMENCEMENT OF PREPARATIONS FOR LAUNCHING.

long, trim forecastle-deck and poop turtle-back deck, and the symmetrical arrangement of the great range of central deck-houses. The Oceanic will have three pole masts and only two funnels.

Of the passenger accommodation it is too early to speak, beyond saying that it will be worthy of the ship and will be carried out in the same perfect manner. It may, however, be added that, besides providing many ingenious new devices for the comfort and well-being of those who travel in her, the whole will be on a scale of magnificence and spacious luxury only possible in a ship of such vast dimensions, carrying the comparatively small numbers the Oceanic is designed to accommodate. The saloon, for instance, will be 80 feet by 64 feet and 9 feet in height with a dome in the center of surprising proportions and great beauty, and some of the state rooms will be 13 feet 6 inches by 9 feet.

SHIPS BUILT WITHOUT A CONTRACT.

From the founding of the "Oceanic Steam Navigation Co., Limited," the White Star Line, by Mr. Ismay, in 1869, every steamship built for the company has been launched from Messrs. Harland & Wolff's yard at Queen's island, Belfast, whose invariable instructions have been to produce the most perfect ship for the service she is intended to perform, regardless of cost. Their instructions, as the late Sir Edward Harland said in his speech at the trial trip of the Teutonic have been such that "we have been put, not on our mettle, but our honor," and as will be readily understood this is more than ever true in the case of a ship like the Oceanic, built in her turn, like all her predecessors, without a contract. It may be supposed, however, that a free hand, though it adds to the

moral responsibility, should decrease rather than augment the general responsibility attaching to the undertaking. A ship has to be built to fulfil certain conditions, and a free hand as to cost must certainly tend to facilitate success in reaching the required standard. Nevertheless there remains responsibility and anxiety in abundance. The difficulty and protracted delay in the launching of the Great Eastern broke the spirit and shattered the health of her designer; and, despite modern improvements, the putting into the water of a still longer and heavier ship has necessarily been an event which has placed a very appreciable strain upon those responsible for its smooth working.

In order to secure a solid bed for the weight of metal it would have to bear, a special foundation of piles surmounted by layers of cross logs was formed to take the usual blocks upon which the keel plate was laid. Roughly speaking, ground solid enough to carry any ship then afloat was compacted into a still more solid mass at a heavy cost and its surface for 160 feet towards the stern, where the principal strain was exerted upon the launchways when the vessel took the water, covered with new 1½-inch steel boiler plates.

PRECAUTIONS FOR LAUNCHING.

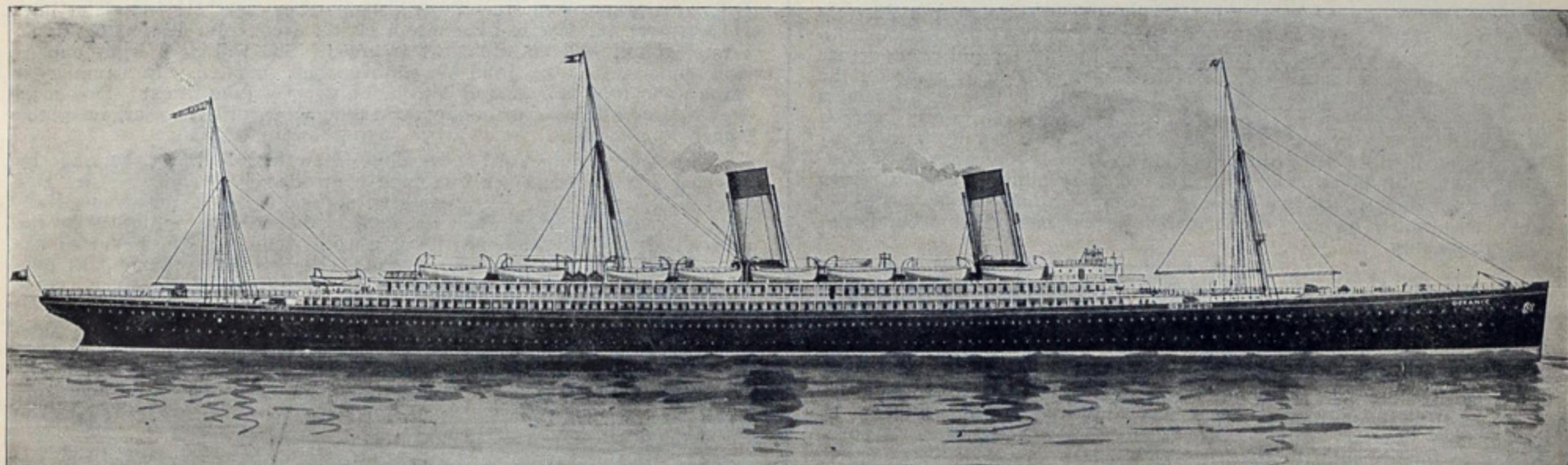
The usual plan for holding a ship in place, i. e., for preventing the force of gravitation causing the running-way to slide down the lying-way, is to secure the two ways by means of side daggers, or, in the case of heavier ships, with an iron-shod center dagger, its head being let into a niche about an inch deep in the keel of the vessel itself, the other end abutting against a cross log of the slip. After the dagger was fixed the keel blocks, shores, etc., which had held the ship in position whilst she was being put together, were knocked away and the ship then rested upon the launchways, technically known as sliding-ways, which have been built up under her. When the moment came for putting her into the water some twenty men then proceeded to knock the dagger out of the niche

the City of Rome (1881), 546 feet long, 8,456 tons and 11,820 horse power; the Umbria (1884), 501 feet long, 8,128 tons and 14,320 horse power; the Paris (1889), 525 feet long, 10,795 tons and 18,500 horse power; the Lusitania (1893), 601 feet long, 12,952 tons and 30,000 horse power, and the Kaiser Wilhelm der Grosse (1897), 626 feet long, 14,379 tons.

IRON ORE BUSINESS OF 1899.

About 9,000,000 gross tons of the 1899 Lake Superior ore product, to be moved during the next season of navigation, has already been covered by lake freight contracts—including, of course, the ships operated by ore interests—at 60 cents from the head of Lake Superior for vessels engaged until Nov. 1, 60 cents from Marquette for the full season and 50 cents from Escanaba. The ore shippers are still engaging vessels at these same rates, and the indications just now are that there will be considerable contract ore for some time to come for vessels that have held out thus far, with possibly some little improvement in the rates or in conditions involved in the contracts, but it may as well be admitted that the ore business, as far as lake transportation is concerned, is already quite well provided for. A great deal of disappointment has resulted from the action of the owners of big vessels accepting a 60-cent Lake Superior rate so early in the year, in view of the great volume of business that is in sight. The rush with which lake freight affairs were closed up was due, of course, to the fact that the Carnegie company, the one big concern having absolutely no vessel property, is interested, first of all, in its ore business, in securing low lake freights. Representatives of this large interest saw an opportunity, if they took up the matter early to duplicate last year's contracts and they did so.

Glancing over a line of figures regarding the amount of tonnage closed up to the opening of the present week, the president of one of the largest Cleveland ore concerns, who is also interested in ships, said: "I have



Twin Screw Royal Mail Steamship Oceanic, Building for the Oceanic Steamship Co.—White Star Line—by Harland & Wolff, Belfast, Ireland.

by dealing it blows with a heavy metal ram and thus released the ship.

On account of the great weight of the Oceanic and the risk involved in getting the daggers knocked away from under her keel, an entirely new plan was adopted. At a point in the lying-way about 450 feet from the stern, the usual timbers were replaced by two solid steel castings, weighing about 15 tons. In the center of each a large wrought-iron trigger was fitted, and on the underside a hydraulic cylinder with a pressure of 6,000 pounds to the square inch, the piston rod of which held the trigger in a vertical position in a groove in the running-way. A pipe had been laid connecting the two cylinders with a hydraulic pump for getting up and maintaining the pressure. When all was clear and the moment of launching arrived, the opening of a small valve relieved the pressure in the cylinders. This allowed the triggers to cant over, and all resistance being removed, the ship slid into the water. As usual, to keep the ways from being drawn out of position inwards they are bolted together from side to side with iron rods, and to prevent their being thrust outwards they are loosely chained together.

The launching was highly successful in every respect. Many notable persons were present and more than 5,000 people were on the 800-foot stand erected on the quay. The time from the opening of the valve releasing the pressure against the triggers to the time when the Oceanic was stationary in the water, represented less than a couple of minutes. But while the ship appeared beyond control, in reality she was under complete control by means of the anchors (three on either side, weighing 40 tons), whose 100 tons of cable were lying coiled on the forecastle deck, or hanging in massive festoons at the ship's sides.

At the moment the ship left the ways, a man with a hatchet severed the rope holding up the anchor at the bow, which fell, dragging its cable after it. Directly that was paid out the second anchors were released in a similar fashion. But the cables instead of being uniformly paid out, had to snap their supports at the points of each festoon. And finally so also with the third anchors. By means of these repeated checks the seemingly irresistible rush died off almost as soon as it began. The Oceanic stopped two lengths from the point where she left the stocks. The weather was fine, and the attendance of spectators reached nearly 150,000.

The movement toward the building of big ships both for ocean and lake traffic is constant, and the White Star Line will have in the Oceanic the biggest of all passenger vessels, while at the same time they already have in the Cymric, launched in October, the largest of freight steamers. The Afric, a sister ship to the Cymric, is almost ready to launch. The first regular liner was the Cunarder Britannic, which sailed from Liverpool on July 4, 1840. She measured 1,340 tons. Other vessels famous in their day were the Britannia (1874), 455 feet long, 5,004 tons and 5,650 horse power; the Arizona (1879), 464 feet long, 5,164 tons and 6,300 horse power;

been in this business for thirty years, and in all that time I have never seen such a fool move as that just made by the vessel owners of the lakes. They had everything in their favor. First of all there is absolute certainty of a volume of business in ore equal if not considerably larger than that of last year; docks at Lake Erie ports clearer than for a great number of years past; an early movement of grain larger than that of last spring; more business in all lines, on account of the general prosperous condition of the country; a season certainly shorter than that of 1898 which opened so early that we moved more ore in April and May than ever before in the history of the business; less vessel capacity to do the work, as no matter how ship yard operations may be pushed the losses from storms and from vessels transferred to the seaboard can not be fully made up until next year. Add to all this the fact that requirements of the northwest have already necessitated the movement of some coal by rail, and I can not see what vessel men have been thinking of. We will get a better price for ore, just the same, as higher costs in other lines require it."

A rumor that Mr. C. W. Elphicke of Chicago, was the first vessel owner to accept the 60-cent ore rate was absolutely without foundation. Mr. Elphicke's Cleveland friends know this, but it is thought well to refer to it, on account of the wide publicity that had been given to a newspaper clipping which originated in Milwaukee.

RECORD OF THE CRAMP SHIP YARD.

In a little resume of its ship building operations the Wm. Cramp & Sons Co. of Philadelphia point out that their plant, which covers 31 acres, represents an investment of more than \$5,000,000 and gives employment to over 5,000 men, who draw in wages weekly about \$50,000. During the sixty-eight years since its establishment the company has built 301 vessels of all descriptions and 185 marine engines. Of the vessels, twenty-three have been United States steam men-of-war, six steam cruisers for the Russian navy, and one gunboat for the navy of Venezuela. Over 100 steamers and steamboats have been constructed, including the Southwark and Kensington and the magnificent American liners St. Paul and St. Louis. There have been a dozen yachts and over three score of tugs, including the Sampson, which was the first steam tug built in America. Twenty-eight sailing vessels were built, eleven vessels rebuilt or lengthened, and sixty other craft constructed. In modern vessels of its new navy the United States has expended at the Cramp ship yard in recent years \$25,250,000. The work in hand upon the Alabama, the Maine, the Russian warships and the completed Kasagi will bring the total up to \$38,000,000, aside from the private contracts.

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Although appointed under a democratic administration, Commissioner of Navigation Chamberlain has proven one of the ablest supporters of the plan of assistance for American shipping, now so urgently advocated in Washington. Mr. Chamberlain's arguments are not of the stereotyped kind. They are indicative of his knowledge of the subject. Referring to what foreign governments are doing in subsidies, he says they will pay this year \$24,500,000 to promote navigation and transportation under their respective flags. "These figures are not guess work," says Mr. Chamberlain. "The items, one by one, which go to make up this somewhat impressive total can be given if necessary. The investment proposed by the Hanna-Payne bill is a profitable one, vastly more profitable for the people of this country than much of the millions we have sunk in some river and harbor improvements. Here, for example, is an extract from a circular issued on New Years day by a New York firm of ship brokers: 'During the past twelve months we have remitted to owners by cable and draft \$22,411,513, money collected for owners' account for the hire of steamers under time charter only, not including the moneys remitted for rate or lump sum freights.' This firm acts as American agents for the owners of 190 small steamships, engaged almost exclusively in the trade between the United States and the West Indies, Central America, Mexico and South America on the Caribbean, and of the entire 190 vessels only six were under the American flag. Putting aside for the moment all considerations of sentiment, is it worth while as a business proposition to try to get a fair share of this trade or is it not? There is no mysterious way by which we can acquire it. It can only be done by the investment of money in the enterprise, and it is for congress to consider whether an investment of say \$2,000,000 yielding a certain return of seven or eight times that amount in freight money alone earned by Americans—not to mention the incidental development of ship building—is worth making."

The problem involved in the reorganization of the personnel which is just at present receiving so much attention in the United States navy, and is the subject of a bill now before congress, is rapidly coming to the front as an issue in the British navy as well. Engineering of London, in the course of a page article on the subject, says: "The prospect of a fusion of the two branches is, as our readers are aware, not altogether new. It has been discussed in the United States, and favorably considered by the assistant secretary of the United States navy as chairman of a board formed to inquire into the matter. Such a step would be distasteful to many of our own naval officers, perhaps the majority both of the executive and engineering branches. But good men as our naval officers are, we must remember that the navy does not exist for them, but for the defense of the country; and if the present arrangement does not lead to efficiency, changes must be made. Such changes could, however, only come into effect gradually, and for that reason the sooner they are initiated the better for the efficiency of our chief arm of defense and the safety of the country."

The protected cruiser Chitose, built by the Union Iron Works, San Francisco, for the imperial Japanese navy, and which was fully described and illustrated in the last issue of the Review, has more than justified all expectations. On her official trial she made a six-hour run over the course in Santa Barbara channel, averaging 21.048 knots per hour, whereas but 20.5 knots are required, and developing a maximum speed of 21.38 knots under natural draft. The vessel has been accepted with the reservation of the forced draft test, which has not yet been reported. This cruiser has averaged 22.867 knots upon two separate occasions, but as the contract calls for the maintenance of 22.5 knots during two consecutive hours a formal test will be made under the forced draft. The data as to horse power and efficiency of propeller has not been completely worked out, but the indications are that with less than 135 revolutions the vessel will make 20.5 knots. Evolution tests made under full speed were very successful, the Chitose turning in a radius of 300 feet and being stopped from full headway to going astern within her own length.

Congressman Burton of the river and harbor committee is certainly to be congratulated upon having matters in readiness thus early to report a river and harbor bill to the house. It is said that the bill will carry appropriations aggregating \$12,000,000 to \$13,000,000. One of the best features of the bill is a clause making provision for more promptness in relieving rivers and harbors of wrecks and derelicts. Great loss of time and annoyance has resulted from the present law under which the secretary of war—or rather, the army engineers—must notify the owner of a wreck by advertisement for thirty days before any action to sell or remove is possible. In the meantime the wreck may cause much damage and bring the traffic of a harbor to a halt. The coming bill will give the government engineers ample power to act promptly as to wrecks and derelicts when an emergency is presented.

Capt. Alexander McDougall of the American Steel Barge Co., West Superior, Wis., has returned from an eastern trip, where he completed arrangements for the new dry dock upon which work has been commenced. He makes the claim that the new dock will be built in a shorter time than any other dock in the world. It will be 606 feet in length, 110 feet width, and the gate entrance will be of sufficient size to admit a vessel of 65 feet beam and 17 feet draught.

VESSELS LAUNCHED.

NEW SHIPS PUT INTO THE WATER AT SEVERAL AMERICAN YARDS—NO INDICATION OF ANY FALLING OFF IN THE AMOUNT OF NEW WORK IN PROSPECT.

The Kershaw, the first of the two steamers building for the Merchants' & Miners' Transportation Co., of Baltimore, which was to have been launched at the yard of the Harlan & Hollingsworth Co., Wilmington, Del., on Saturday, Jan. 14, stuck on the ways, but will probably be launched this week. She is a four-decked vessel of 270 feet on the water line, 42 feet beam molded, and 34 feet depth of hold. Engines are of the direct acting, triple expansion type with inverted cylinders, 28, 45 and 72 inches diameter by 48 inches stroke. Steam will be supplied from four cylindrical return tubular boilers of 13 feet 6 inches diameter by 11 feet 6 inches long, with a working pressure of 160 pounds. The draught of the vessel will be 18 feet and the estimated speed 15 knots. The Kershaw will have a complete equipment of Blake feed, bilge and water service pumps, and the engines are provided with independent air pumps of the Blake vertical twin type. This steamer and her sister ship, the Nantucket, which has not yet been launched, will be provided with Morison furnaces, Baldt stockless anchors and Williamson steering engines.

The new ferryboat, Noddle Island, was launched last week at the yard of William McKie, East Boston, Mass. The boat, which will cost \$70,000 and is to be completed by March 1. She is 164 feet in length, 57 feet beam and 9 feet draught, and will be propelled by compound engines, to which steam will be supplied from two boilers of the gunboat type, 8 feet in diameter by 19 feet long. The Lockwood Manufacturing Co. will supply the boilers and machinery, and the equipment includes independent air and circulating pumps, feed, fire and boiler circulating pumps, Morison furnaces and Williamson steering engines.

The Pusey & Jones Co., Wilmington, Del., have contracted to build for J. Rogers Maxwell of New York a steel steam yacht 117 feet water line, 140 feet over all, 18½ feet beam and 11 feet deep, from designs by H. C. Wintringham, well known naval architect. She will have triple expansion engines, built by John W. Sullivan and supplied with steam from Almy water tube boilers, and is to be finished by June 1 next. Two large deck houses will be of mahogany, and the yacht will have a large naphtha launch as a tender.

The Allison Ship Yard & Drydock Co., established fifty years ago by Michael Allison, but since his death controlled by the Jersey City Dry Dock Co., Jersey City, N. J., has been notified by the Pennsylvania Railroad Co. to vacate its present location, as the property is needed by the railroad for an extension of its water front facilities. The company has until March 1 to find another location. The Pennsylvania company purchased the site about ten years ago, when the ship yard was given a lease of the place.

The Alaska Exploration Co., San Francisco, Cal., is building the side-wheel steamer Leon and the barge Otter. The Leon is 180 feet keel, 35 feet beam, 7 feet depth, and will cost \$45,000. She will be equipped with tandem compound engines with cylinders 16 and 28 inches by 84 inches stroke and firebox boilers. The barge is 150 feet long, 33 feet beam and 6 feet depth and will cost \$9,000.

The Burlee Dry Dock Co. of Staten Island, has contracted to build a tug for the Black-Sheridan-Wilson Coal Co. of Baltimore. The boat will be 143 feet long, 29 feet beam and 16 feet depth of hold. She will be built of wood, have triple expansion engines and will carry between 200 and 300 tons of coal.

Woodall & Co., Baltimore, Md., are building to the order of the United States navy department a wooden barge for transporting large guns from the Washington gun foundry to Indian Head on the Potomac river. The barge will be 80 feet long, 30 feet beam and 8 feet deep.

The Consolidation Coal Co., Baltimore, has just closed a contract for another tug, the third within a year. This one goes to the Columbian Iron Works, Baltimore, Md.

The Montreal harbor commissioners have awarded to Carrier, Lane & Co. of Levis, Quebec, at \$44,000, the contract for the construction of a steam dredge with steel hull.

E. J. Rathbone, 1523 35th Avenue, Seattle, Wash., writes to the Review that he has just about closed contracts for the construction of four wooden vessels.

The city council of Buffalo, N. Y., has decided to expend about \$700,000 in the improvement of Buffalo river and several bridges will be constructed.

The Milledgeville Steamboat Co. of Milledgeville, Ga., has been incorporated with a capital stock of \$10,000 by J. W. McMillan and Millard Wagnon.

The Atlantic Works, East Boston, Mass., are at work upon two wooden towboats for Haley & Appleton of Boston. They will be 125 feet over all.

The Hamburg-American Steamship Co. has purchased 150 feet of water front at Hoboken, N. J. and will construct a double-deck pier.

J. M. Marshall, chief quarter-master, San Francisco, has called for bids for furnishing a steam launch for the San Diego barracks.

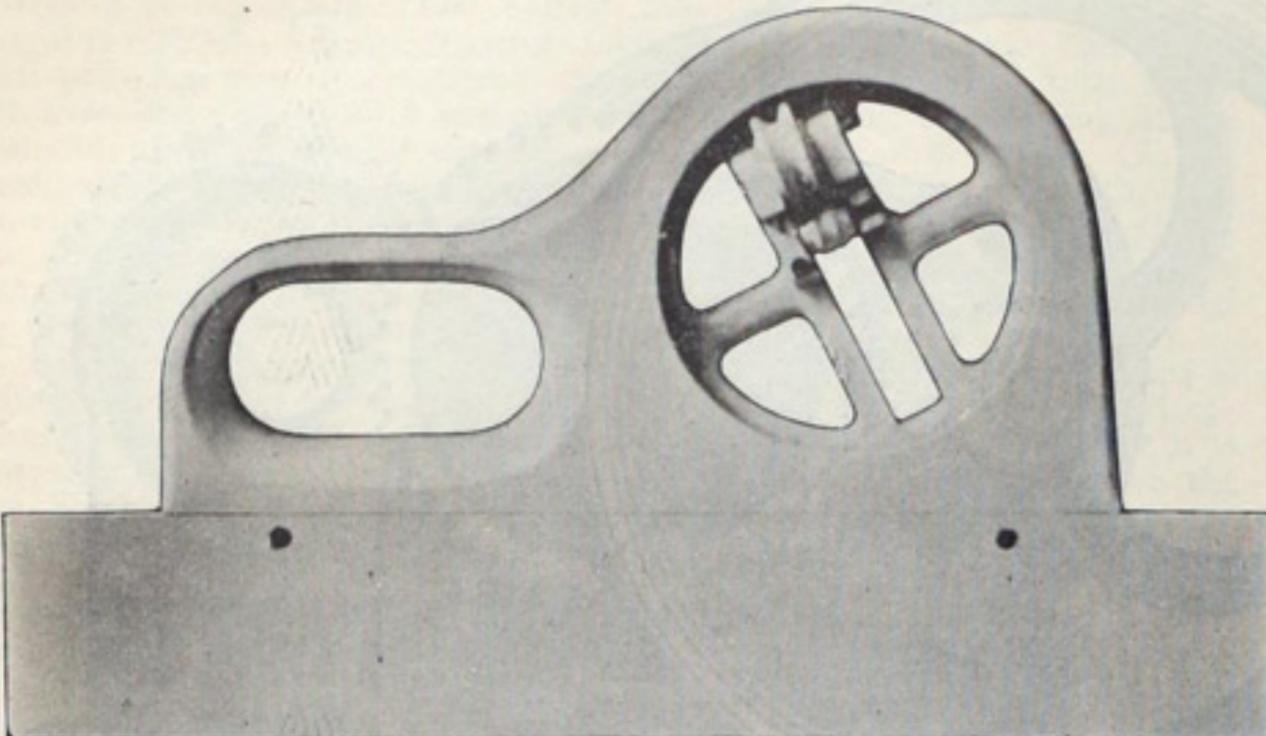
Griffen & Davidson, a new firm of boat builders, has been established at South Portland, Me.

Branch No. 53, Marine Engineers Beneficial Association of Marine City, Mich., has elected the following officers for the ensuing year: President, David Burns; vice president, Lemuel Hill; recording secretary, E. H. Hill; corresponding secretary, Harry Stone; financial secretary, Frank Ouelette; treasurer, Frank B. Parker; trustees, Frank Ouelette, David Burns, Edward H. Hill; representative to national convention, Frank Parker.

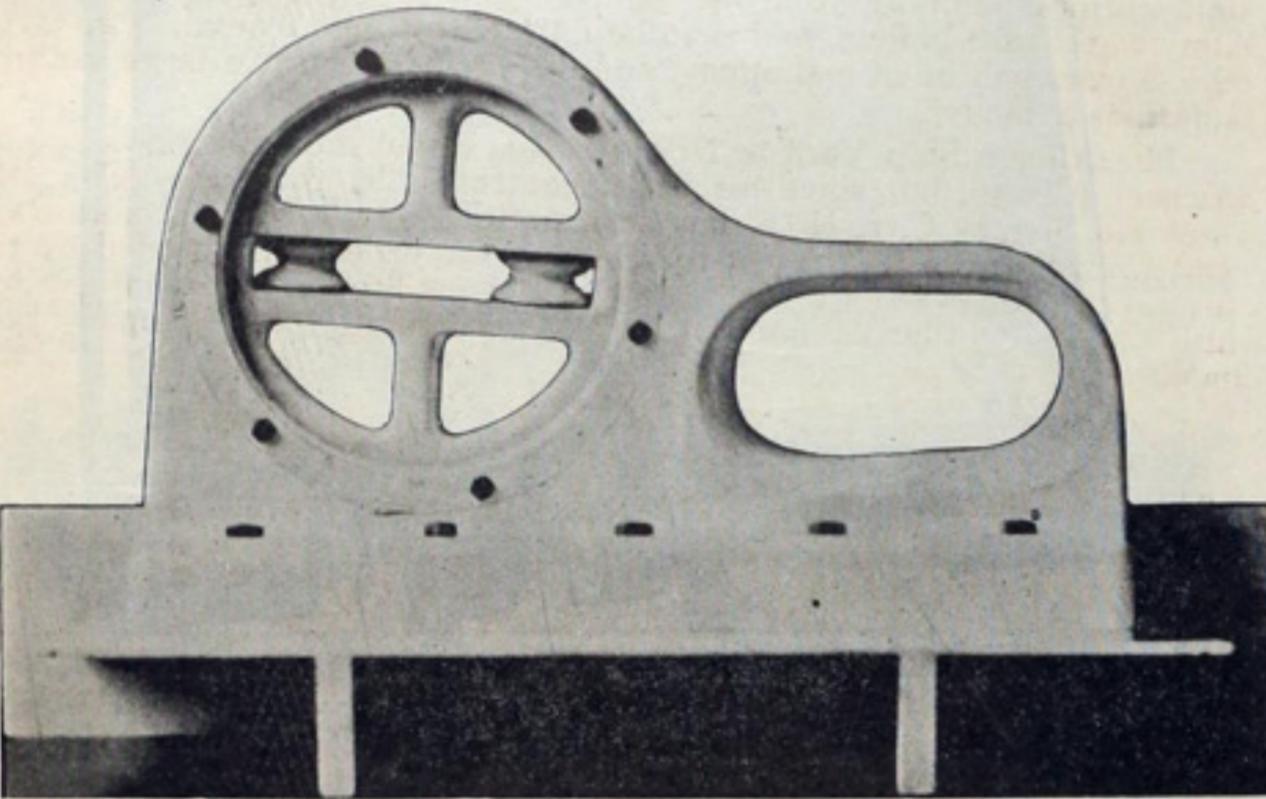
Chief Engineer W. M. McFarland, who left the navy recently to take up a position with the Westinghouse company, managed to get down to Washington long enough last week to give the naval personnel bill a final boost as it passed the house.

CHOCK FOR MOORING AND TOWING LINES.

The accompanying engravings illustrate a new design of side mooring chock for large steel vessels, gotten up by D. E. Ford of the American Steel Barge Co., West Superior, Wis. The idea may be applied also to towing chocks. The revolving disc travels on ball bearings, and admits of the mooring line leading at any angle. This chock was applied



during the past season on the whaleback steamer Alexander McDougall, and its success from the first was assured. A complete outfit has since been fitted, by request of Mr. L. M. Bowers, to the steamer Morse of the Bessemer fleet, and they will be fitted during the winter to the barges Fritz and Roebling, also of the Bessemer fleet. An outfit will be applied also to the barge now building for the same company at the West Superior



works. A patent on this chock has been applied for, and the American Steel Barge Co is ready to take orders for outfits of this kind for any new vessels building, as well as vessels in commission. The American Steel Barge people think they have in this device the best thing of its kind in the market.

VALUABLE PUBLICATION FOR ELECTRICIANS.

Ten years ago electrical energy was invariably supplied at a fixed rate per month for each installation without much regard to the amount actually furnished. Today electric stations in this country supply on a meter basis the electricity they manufacture, with resultant advantage to the station economy. Some idea of the extent to which the meter business in this country has grown may be gathered from the fact that not less than 200,000 Thomson recording watt meters alone have been manufactured and sold by the General Electric Co. The business has grown from small beginnings by the persistent missionary work which has been carried on by this company through both agents and literature. The latest addition to the meter literature issued from the General Electric press is "Thomson Recording Watt Meters," a handsomely printed and illustrated brochure in a rich cover, dealing with the different types of these recording energy meters, which the General Electric Co. manufactures, their uses and their advantages. Each type of meter is clearly described and so illustrated that its construction can readily be understood. Full instructions are given for the care, connection and reading of these meters. The pamphlet should be found in the library of every electric light and power station, and will be sent on application made to the Schenectady office of the General Electric Co.

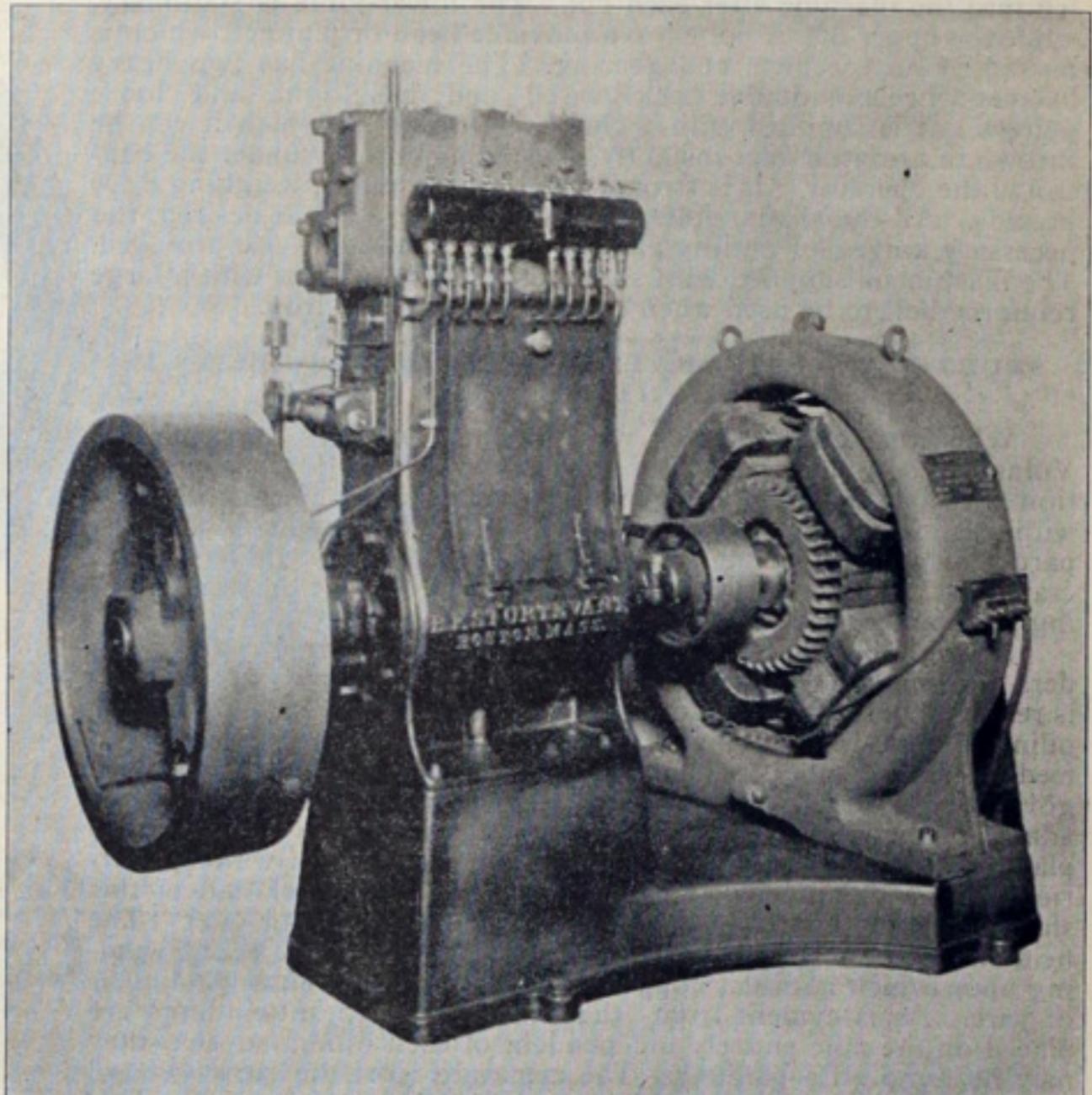
It is evident that the harbor commissioners of Montreal have a stupendous task before them in the proposed elaborate improvements of their port. It is said that the river is subject to a freshet rise of 28 feet. It is proposed to widen the channel between Montreal and Quebec, a distance of sixty-odd miles, from 300 feet to 500 feet, and dredge it an additional depth of 2½ feet, including about 4 miles of rock bottom. The channel work alone, it is estimated, will cost about \$10,000,000.

Major Clinton B. Sears, United States engineer at Duluth, Minn., advertises elsewhere in this issue for bids on a large amount of concrete work connected with the building of piers at Duluth.

Arrangements are being made for the next International maritime conference which will be held in London, probably in May or June.

A COMPLETE ELECTRIC PLANT.

Referring to the electrical equipment on the new steamer Kate Adams of the Memphis & Arkansas City Packet line, Mr. Ellison, one of the officials, said: "It is without doubt the finest and most modern of any that has yet been placed aboard a steamboat in this part of the country." The generating set consists of a Sturtevant engine and a direct-connected gen-



erator, made by the Triumph Electric Co. of Cincinnati. The plant runs 350 incandescent lamps, five 2,000 candle power arc lamps and one 4,000 candle power search light. The set is the same in all essential details as the plant on the Howard Gould yacht Niagara.

COST OF PURCHASED VESSELS.

More money was expended by the United States in purchasing vessels for the war with Spain than is usually required for the support of the entire naval establishment for one year, with moderate provision for new vessels, says the Army & Navy Journal. The sum total paid for ships added to the navy from the merchant service, including cruisers, yachts, colliers, tugs, water barges and all other types, was \$21,431,106.80, and to put them in condition for service nearly \$5,000,000 was expended at ship yards. The most expensive group bought was the five Morgan liners, for which the government paid \$575,000 each. The hospital ship Solace, however, cost \$600,000, and next to the New Orleans was the most costly of all newly acquired ships. For the Merrimac the government paid \$342,000, and with her 3,000 tons of coal on board when she was blown up she represented nearly \$500,000. The Supply and Vulcan cost \$375,000 each, the refrigerating ship \$247,000, the Scorpion \$300,000, Gloucester \$225,000, Vixen \$150,000, and the Mayflower \$450,000, the latter being the largest of the yacht class bought. The English-built ships were more expensive than was generally realized, but it was understood at the time that the government was paying a good price for them. The New Orleans cost, delivered to the naval attache at London, \$1,428,215.54, and the Albany, when she is completed and delivered, will represent about the same sum. To secure the vessel the government paid down cash \$259,000. The Topeka, which came across just as war was declared, cost the country \$170,327, and the little torpedo boat Somers \$72,897. All of these ships purchased abroad have been delivered except the Albany, and the torpedo boat, which was laid up after unsuccessful attempts to clear the English channel in the face of heavy weather.

"RECORD OF AMERICAN AND FOREIGN SHIPPING."

The volume for 1899 of the "Record of American and Foreign Shipping" which is the thirty-first annual issue of this valuable register and classification of shipping, is now being delivered to subscribers. The "Record" contains full reports and particulars of about 17,000 vessels of all classes and nationalities; rules for the construction and classification of iron, steel and wooden vessels; rules for the construction and survey of steam machinery and boilers for vessels; provisions for the installation of electric lighting and power apparatus on shipboard, and much other valuable information of special importance to underwriters and all firms or persons interested in shipping. Besides the usual full information for the benefit of subscribers in the way of rules for construction, with their accompanying illustrations and tables, all of the utmost practical and technical value, the work contains such features as lists and addresses of prominent ship builders, dry docks, marine railways, marine machinery and boiler constructors of the United States; lists of vessels whose names have been changed; also compound names indexed as per last name; names and addresses of owners of vessels classed in the "Record." The work is approved and indorsed by the important boards of underwriters in the United States, and is accepted by merchants and underwriters throughout the world as a standard register and classification of shipping. The new "Record" is published by the American Bureau of Shipping, 37 William street, New York.

SHEAR FOR HEAVY WORK.

The New Doty Mfg. Co. of Janesville, Wis., has recently brought out a shear which is designed for heavy work in boiler shops and other places where sheet metal is handled. It will cut plates $\frac{3}{4}$ inch thick and of any width or length. It will also cut $1\frac{1}{2}$ -inch round iron or its equivalent in flat iron, and also 4-inch angle iron. The body of the machine is so constructed that there is plenty of clearance to allow the plate to be fed into the machine after each cut. The lower knife is stationary, while the upper one is bolted to a movable head or plunger, which is moved by an eccentric and gearing. The machine has two heavy balance wheels, is double back geared and has tight and loose pulleys. It is supplied with a clutch, by means of which it can be thrown in or out of gear instantly, thus being entirely under the control of the operator. It is strongly and heavily made, weighing 8,400 pounds. All the shafts, bolts, etc., are of steel. When desired, the necessary knives for cutting angle iron up to 4 inches are provided. The machine is supplied with stubs for gauges and also with a large reinforce bolt to be used when cutting bar or angle iron.

STURTEVANT GENERATING SET WITH DOUBLE UPRIGHT ENGINE.

When the ship Bay State was equipped by the Massachusetts Volunteer Aid Association for her praiseworthy efforts in connection with our late war, the type of generating set illustrated here-with was introduced for lighting purposes. This engine is of a type particularly desirable for such work, being double-cylindered with cranks set at an angle of 180 degrees, so as to balance the reciprocating parts and to permit of high rating speed.

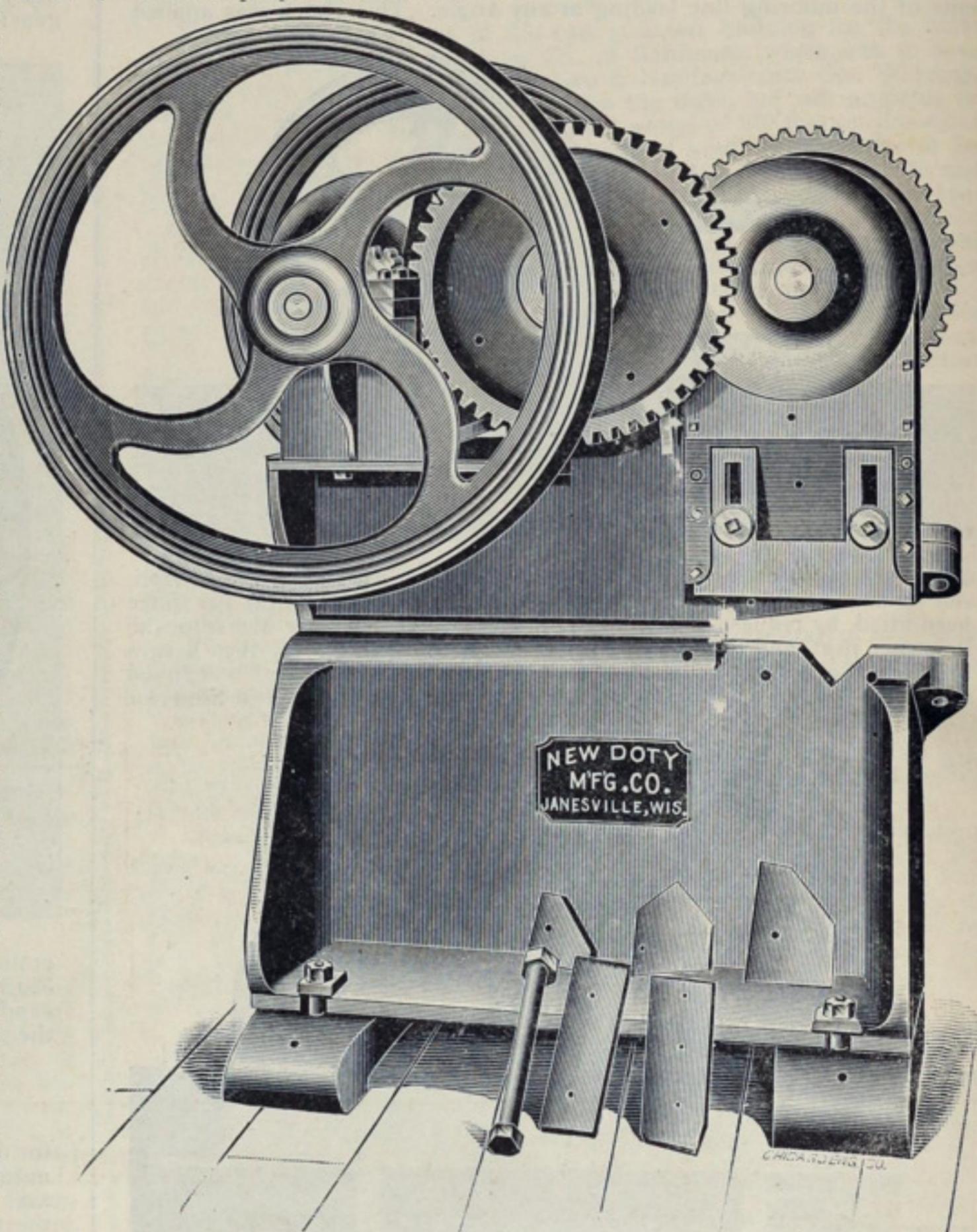
A single piston valve regulates the steam supply of both cylinders and materially simplifies the construction. The running gear is rendered perfectly accessible through the door in the front, and all oiling is done from a single tank, provided with independent sight feed oilers and tubes to conduct the oil to all bearings. The governor is of the inertia type, and arranged to regulate the steam admission between 0 and $\frac{3}{4}$ cut off. Mounted on a common bed plate with the engine is the generator, the armature of which is carried upon a common shaft with the engine, the outer end of this shaft being supported by a pedestal provided with ring oiler. The field ring is of cast steel, provided with four poles, the series-winding upon which is of flat copper ribbon, while the shunt-winding is of wire. As is evident from the illustration, these windings are placed on the pole entirely independent of each other, so that they may be removed separately. The armature is of the barrel-wound type with internal spiders which support the discs, and through which, in connection with spaces left in the winding, a thorough circulation of air is produced when the machine is in operation, thereby keeping it well ventilated and cool. The brushes are of carbon, the brush-holders being of the reaction type, and they are arranged for continuous operation without sparking at all changes of load up to 25 per cent overload. The design is such as to keep the temperature rise inside of 90 degrees Fahrenheit after ten hours' continuous run.

This set was designed, constructed and installed by the B. F. Sturtevant Co. of Boston, Mass. It is one of a series of sizes ranging from engines each having two cylinders $3\frac{1}{2}$ by $2\frac{1}{2}$ up to 8 by $5\frac{1}{2}$, with a corresponding range of output in watts from 4,500 to 32,000, and of weight from 1,650 to 9,000 pounds.

ANOTHER JAPANESE BATTLESHIP.

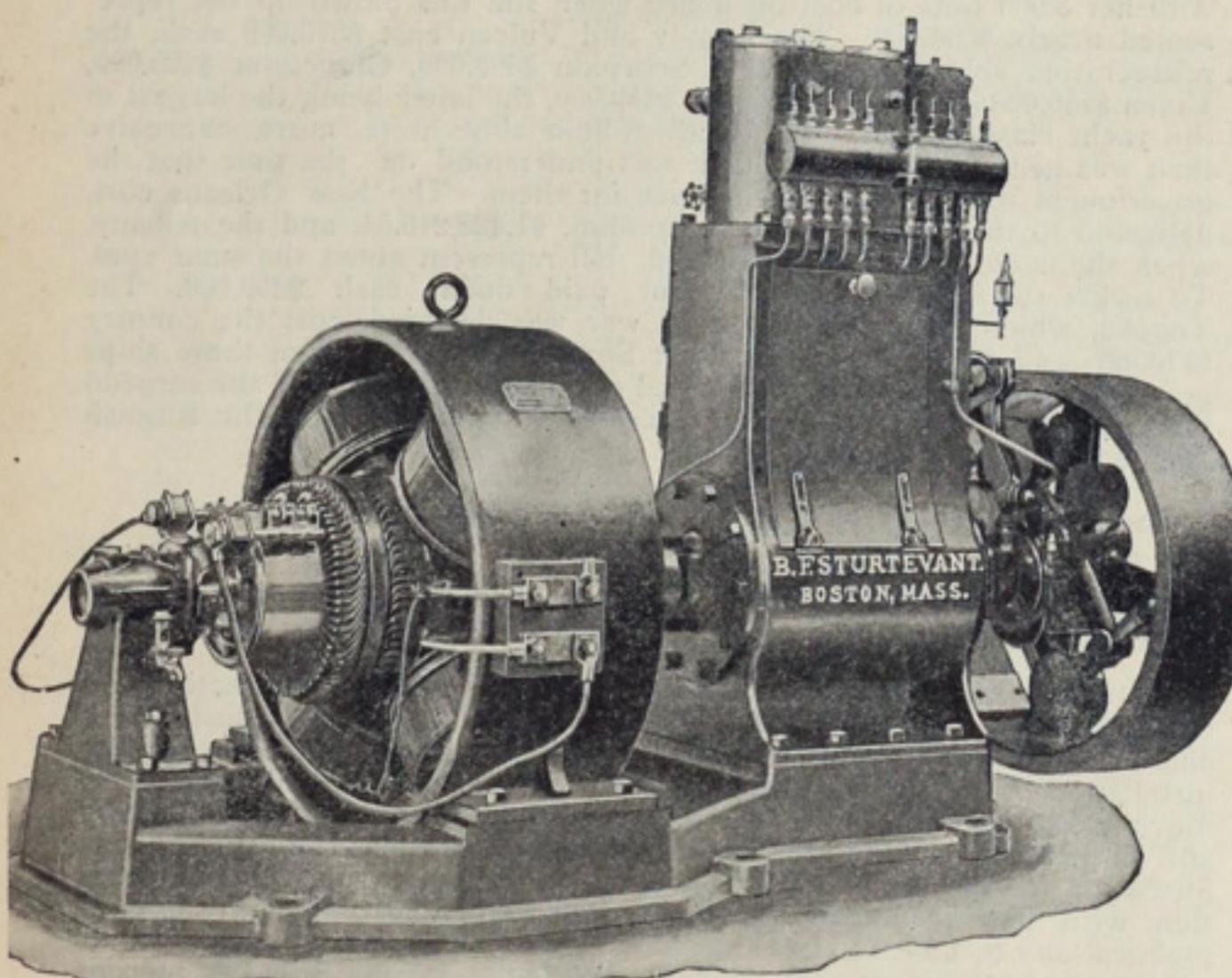
Messrs. Vickers, Sons & Maxim, the English firm which, according to recent reports, has acquired an interest in the Newport News Ship Building & Dry Dock Co., has just begun work at their plant at Barrow-

will be 4 inches on the slopes and $2\frac{1}{2}$ inches on the flat part. The engines will develop 15,000 indicated horse-power, giving the ship a speed of 18 knots, when running at their normal piston speed. Bellville boilers will be used, twenty-five or twenty-six in all, and they will be as liberal in their proportions as in the case of the boilers of recently constructed



SHEAR FOR HEAVY WORK, MANUFACTURED BY THE NEW DOTY MFG. CO.

British battleships, while the working pressure will be 300 pounds at the boilers and 250 pounds at the engines. The twin engines will be of the triple expansion type, with three cylinders, the diameters being: High pressure, 31 inches; intermediate, 50 inches; low pressure, 82 inches; with a stroke of 48 inches. The armament will consist of four 14-inch breech-loading guns, mounted in pairs in barbettes, two at the forward and two at the after end of the vessel; fourteen 6-inch, quick-firing guns, ten being placed on the main deck and four on the upper deck; twenty 12-pounder quick-firers in suitable positions on the upper and main decks; a large number of machine guns, and four submerged 18-inch torpedo tubes. This equipment, when compared with that carried by British warships of the same class, shows that the Japanese ship has two additional 6-inch guns and eight more 12-pounders than are usually fitted. The method adopted for protecting the 6-inch guns on the main deck is decidedly novel. These guns are to be enclosed in an armored box battery extending the whole length of the citadel, and thus from considerably below the water line to the upper deck the ship's side will be completely covered with hard-faced steel made on the improved Harvey-Krupp process, manufactured, along with the remainder of the armor, at Sheffield by Messrs. Vickers. The isolation afforded by the usual separate casemate for each gun is secured in the Japanese ship by the introduction of thick steel bulkheads, placed between each of the gun stations and in the rear of the guns. Mr. James Dunn, lately the chief constructor to the British admiralty and now a director of the Vickers firm, who has designed the ship has thus overcome an important disadvantage. With the ordinary casemates the greater part of the side plating of the ship, that between the gun stations, is left without armor; whereas in the Japanese ship, in addition to gun protection analogous to that afforded by the casemates, the whole of the central part of the ship wherein the guns will be housed, is so protected as to exclude all possibility of injury around as well as within, the gun station from shot or shell fired by the enemy in action; a distinct advantage is thus insured over a partially protected ship. This point will be readily appreciated when it is understood that whereas in the box battery arrangement about five-eighths of the exposed target area is protected by armor, only about one-half of this area is so covered in the casemate arrangement.



GENERATING SET FOR SHIP BAY STATE, DESIGNED BY THE B. F. STURTEVANT CO.

in-Furness, England, upon another immense battleship for the Japanese navy. The vessel is to be 400 feet long between perpendiculars, 76 feet beam, with a draught of 27 feet 3 inches, this being the limit for Japanese waters, and the displacement will be 15,200 tons. The armor will extend right to the ram, and will vary from 9 inches to 4 inches in thickness. The barbettes will be of 14-inch to 10-inch steel, and the protective deck

Leonard J. Wilson, formerly with the firm of Joseph Thomas & Sons, has established a yacht building plant at Ferry Bar, Baltimore, Md. He will build all classes of yachts and naptha launches and already has contracts for several vessels.

CANADIAN CANAL IMPROVEMENTS.

In connection with a recent report of progress in the improvement of the Canadian canals now under way, it is stated that there has been expended on the canal system from the great lakes to the Atlantic seaboard a total of \$60,000,000. On the Farran's Point canal, to avoid the Farran's Point rapid, the enlargement consists in the building of entrance piers, a lift lock 800 feet long by 40 feet wide and the straightening and enlarging of the prism. The Rapide Plat canal has been enlarged at a cost of \$1,600,000. On the Iroquois section of the Galops canal there have been provided new crib entrance piers, a new lock 800 feet long by 45 feet wide, the cutting of a new prism, and deepening and cutting at the west end, all of which will cost in the neighborhood of \$790,000. On the Cardinal section of the Galops canal a new cut has been made through the village of Cardinal and the approximate value of the work is \$1,180. The deepening of the Lachine canal between St. Gabriel and Lachine to a depth of 16 feet is practically completed. In Lake St. Louis a channel has been cut 300 feet wide and 27 feet deep for a distance of four miles.

Collingwood Schreiber, chief engineer of the Canadian department of railways and canals, recently expressed the opinion that the work of deepening the canals to 14 feet would be completed by May 1 next, but it is now asserted that the suspension of earth excavation and filling on the new Soulange canal for the winter will delay the opening of the improved water route until 1900.

In the specifications descriptive of his most recent patent, C. A. Parsons, builder of the Turbinia, describes it as an arrangement of a turbine set of a type suitable for fast vessels, where greater security against breakdown and greater economy when working at a reduced speed are desired.

The admiralty court, sitting at London, has found that the French liner La Bourgogne was to blame for the collision with the British ship Cromartyshire on July 4, near Sable island. The Cromartyshire was awarded damages and costs.

A dispatch from Duluth says that elevator capacity at the head of the lakes will be increased 5,000,000 bushels by the erection of three new houses—one by the Great Northern road, one by Spencer, Kellogg & Co. of Buffalo and one by the Armenia Sharon Land Co.

The new Ward line steamer Havana, built at Cramps' yard, Philadelphia, had a builders' trial several days ago. Her sister ship, the Mexico, will be launched in the near future.

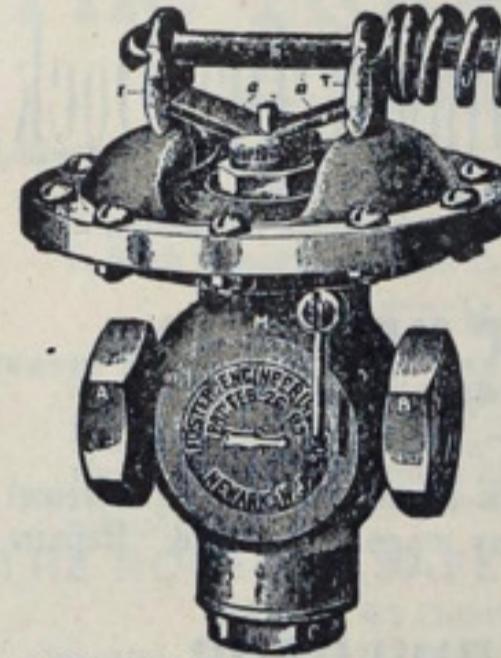
George M. Andrews, for several years superintendent of the marine department of the Campbell & Zell Co., Baltimore, Md., has secured a responsible position at the Cramp yard, Philadelphia.

J. S. Keefe, for ten years traffic manager of the Illinois Steel Co., has resigned to accept a similar position with the new American Steel & Wire Co.

The great lakes steamers Josephine and George Farwell, chartered by the Manhattan Steamship Co. for service between New York City and Portland, Me., were at last reports still at Yarmouth, N. S. The Josephine is on a rock in the harbor, and Halifax parties have tendered bids for floating her. The Farwell's chief engineer left her at Shelburne and she is waiting for one to be sent from New York.

Ten days stop-over at Washington.—Tickets to Philadelphia and New York over Pennsylvania short lines may be obtained via Washington, and good for a ten days' visit at the national capital, at the same fares as apply to Philadelphia and New York over direct lines of Pennsylvania system. For further particulars apply to Pennsylvania lines ticket agents or address C. L. Kimball, passenger agent, Cleveland, O.

The William Cramp & Sons Co., Philadelphia, has called a special meeting for Feb. 21 to authorize an issue of \$1,500,000 thirty-year first-mortgage 5 per cent gold bonds to retire all outstanding obligations.



THE FOSTER "New Class W" Pressure Regulator.

The Experimental Board of the Bureau of Steam Engineering of the U. S. Navy, after recent tests, report that it is:

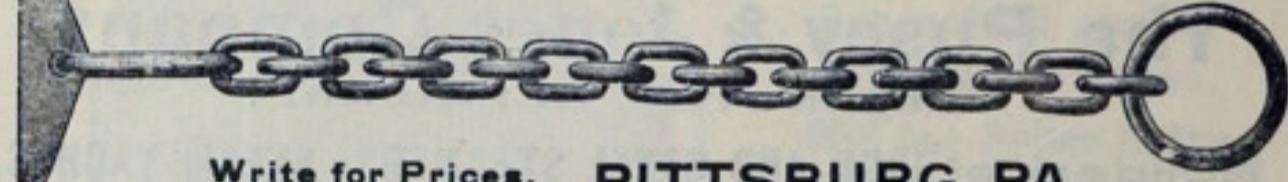
"THE BEST PRESSURE REGULATOR AND REDUCING VALVE WITHIN THEIR KNOWLEDGE."

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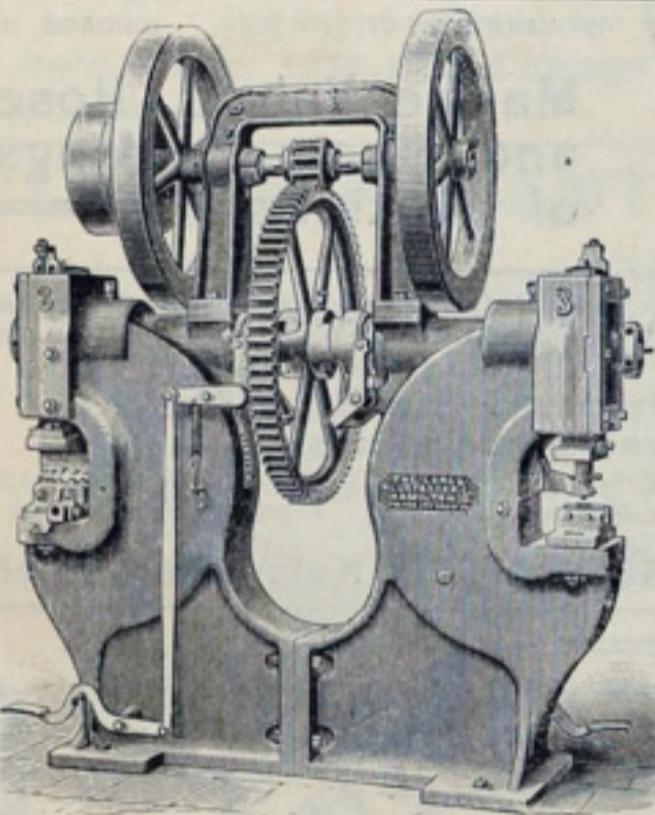
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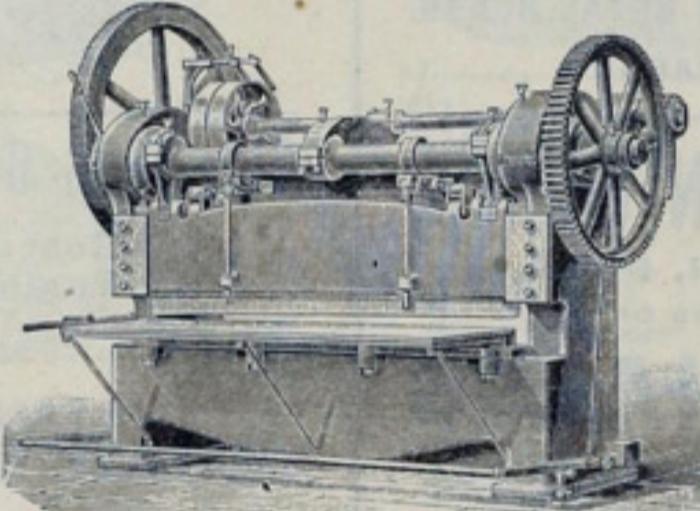


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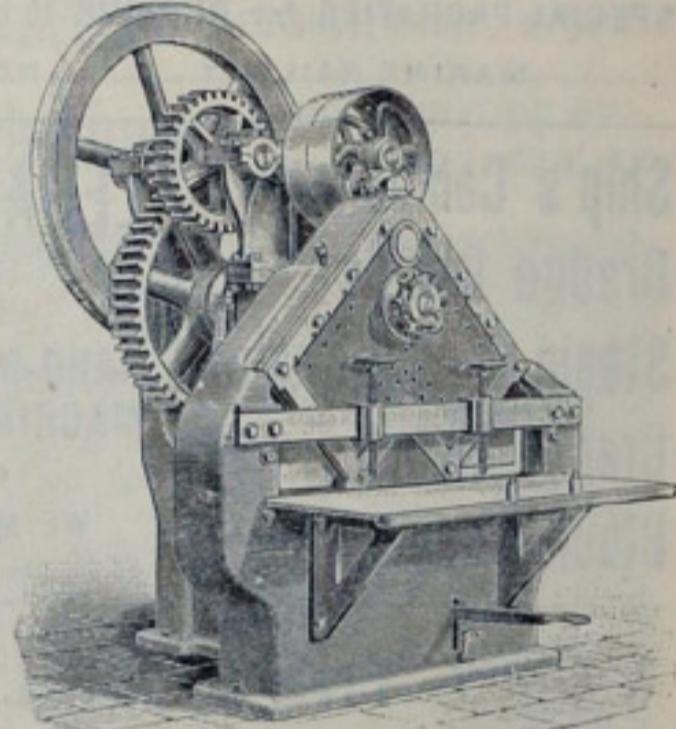


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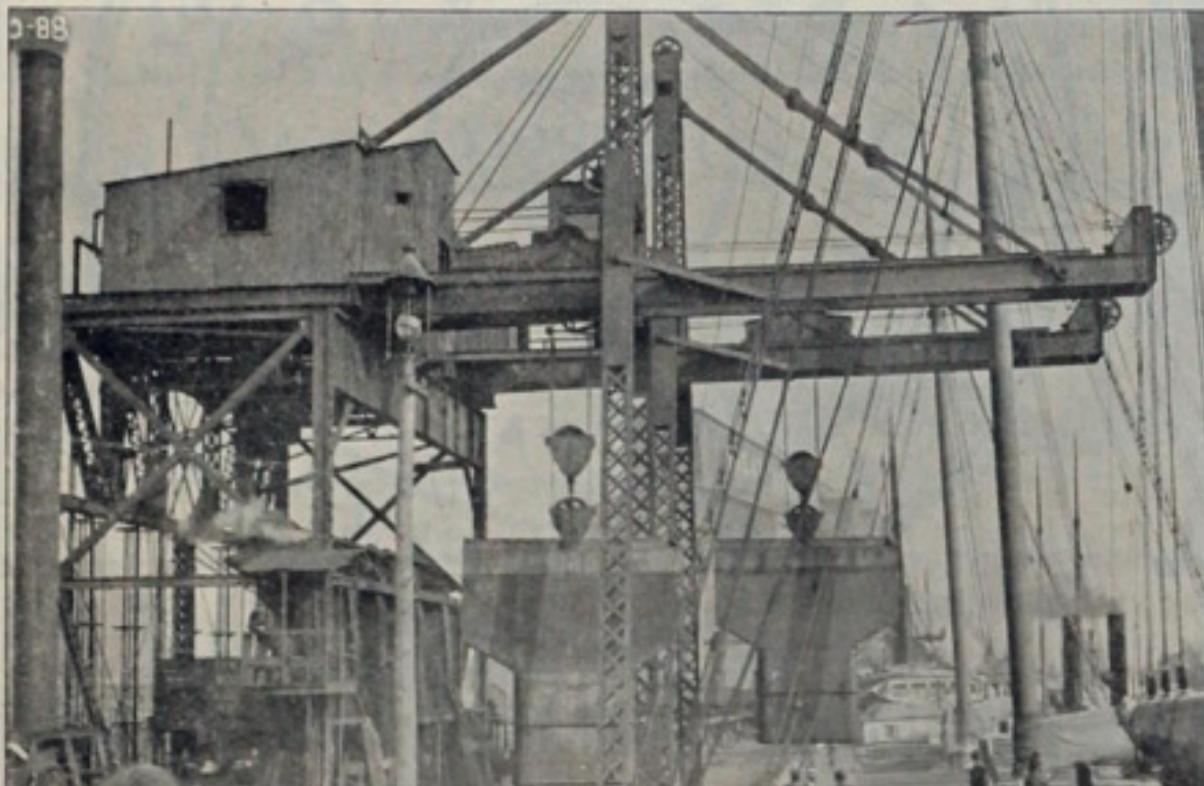
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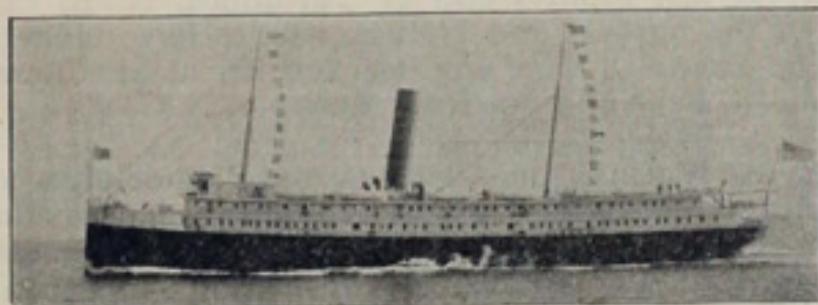
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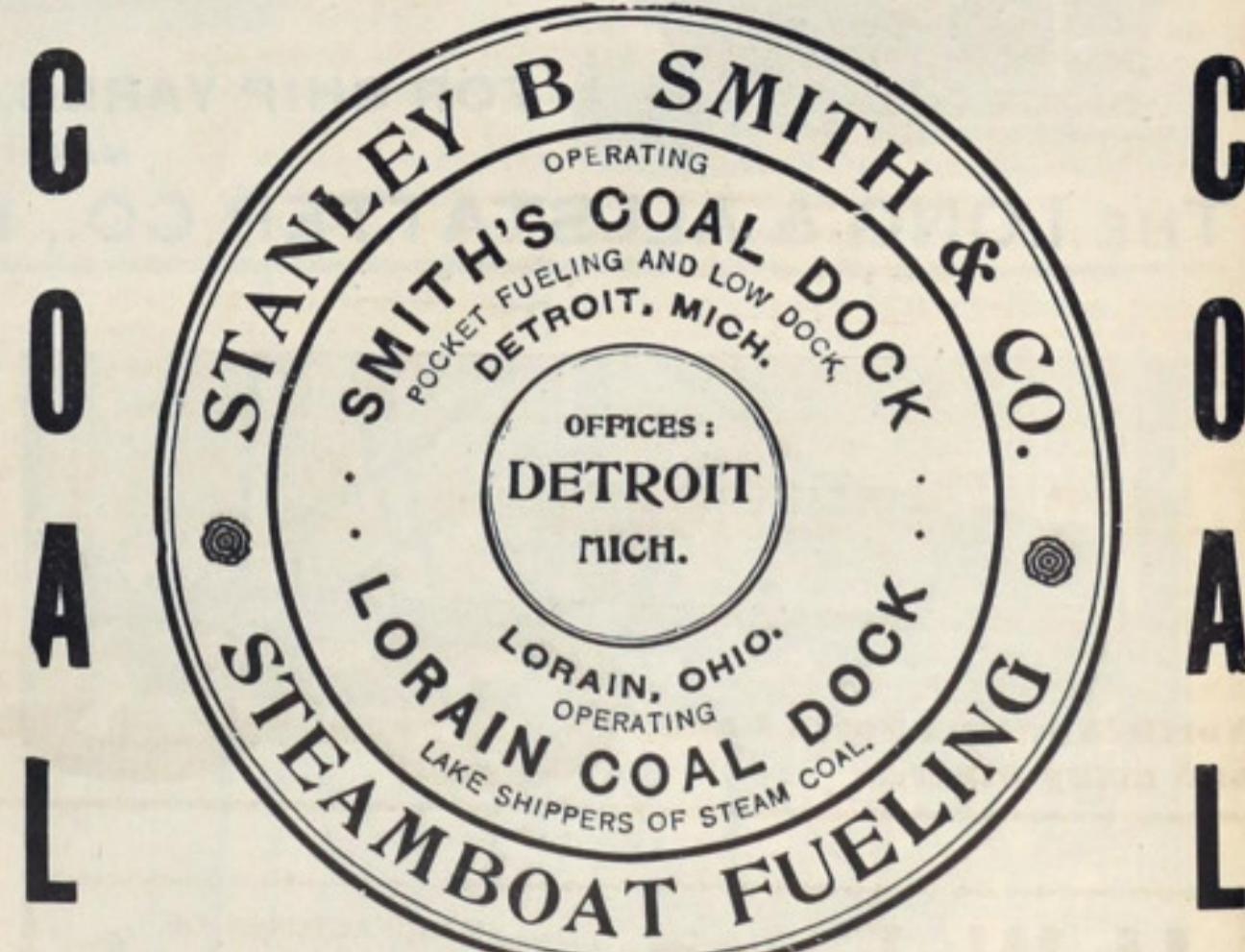
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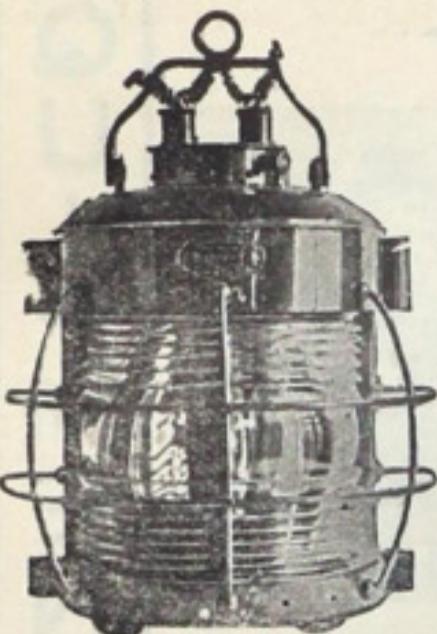
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PATENTS

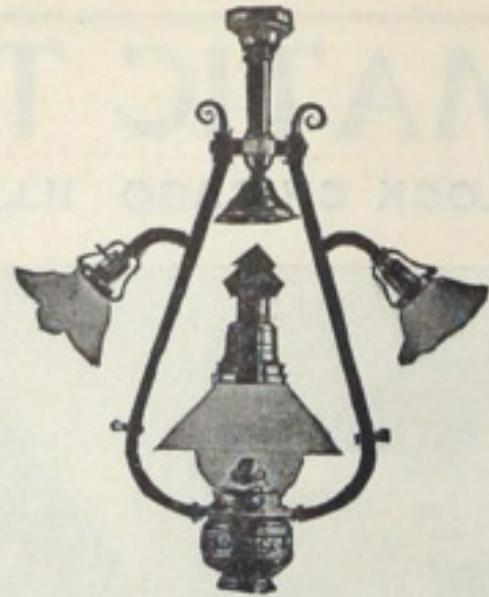
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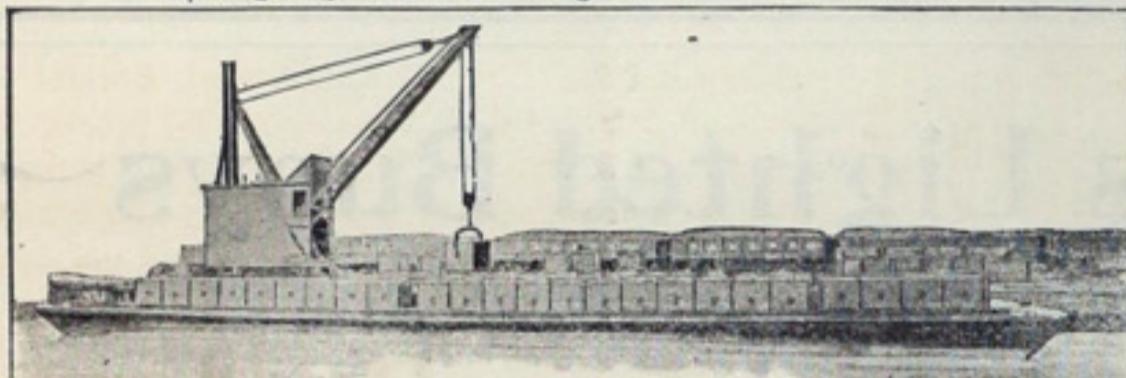
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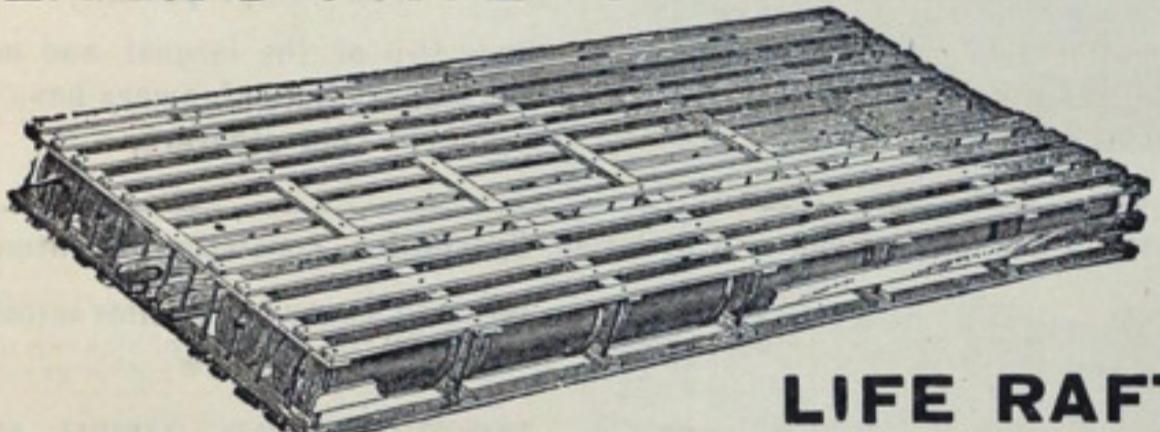
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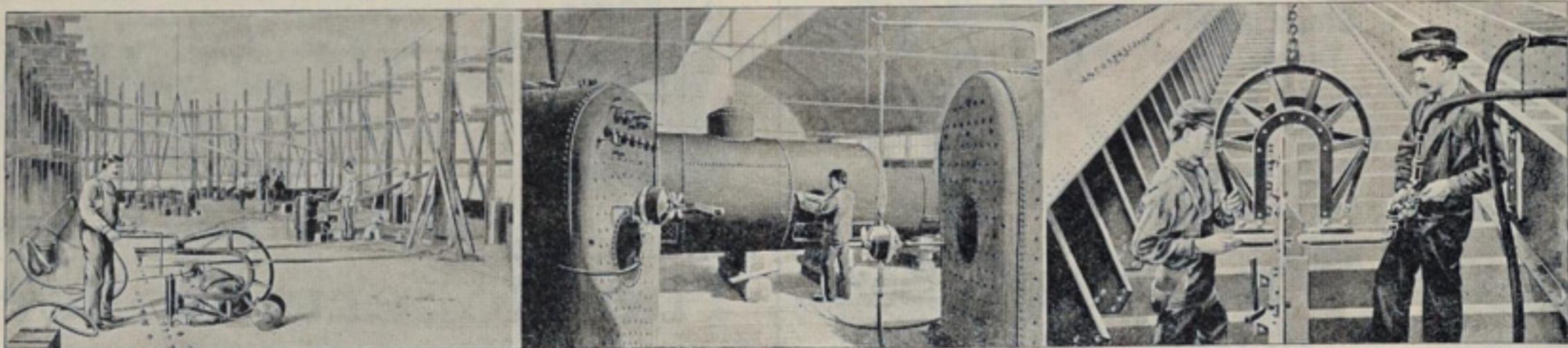


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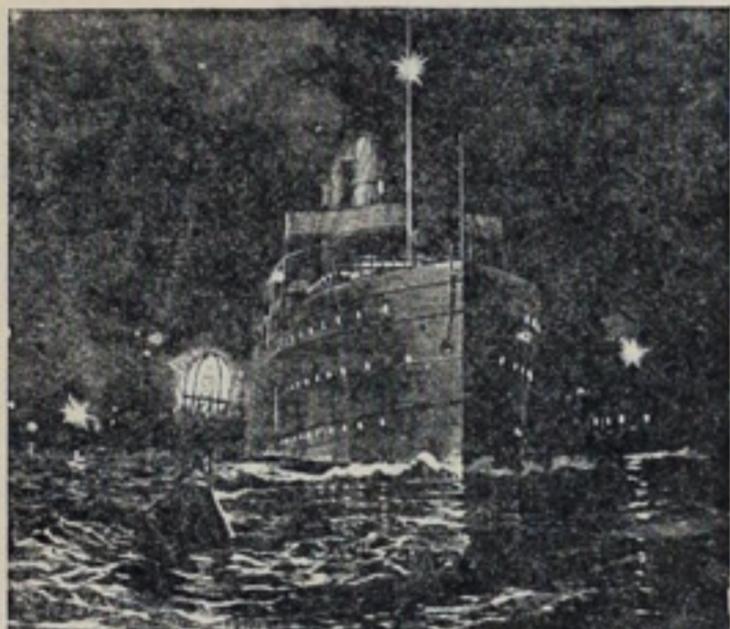
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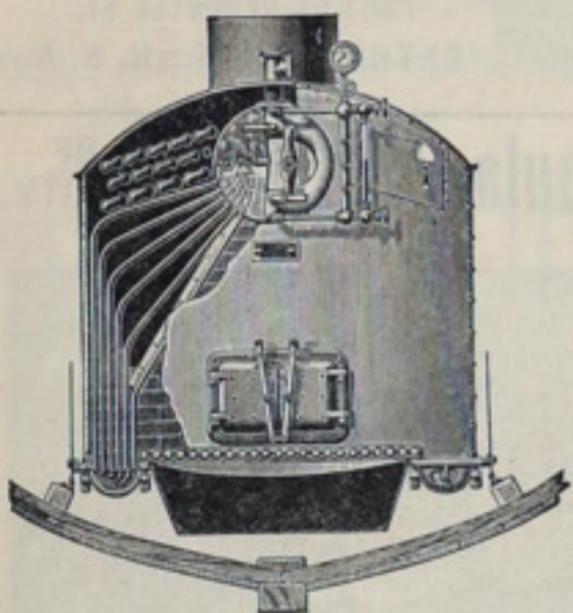
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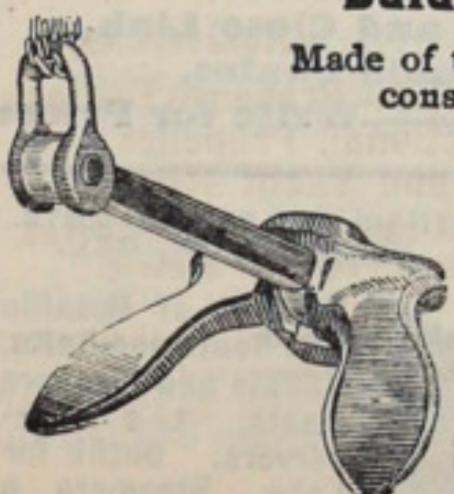
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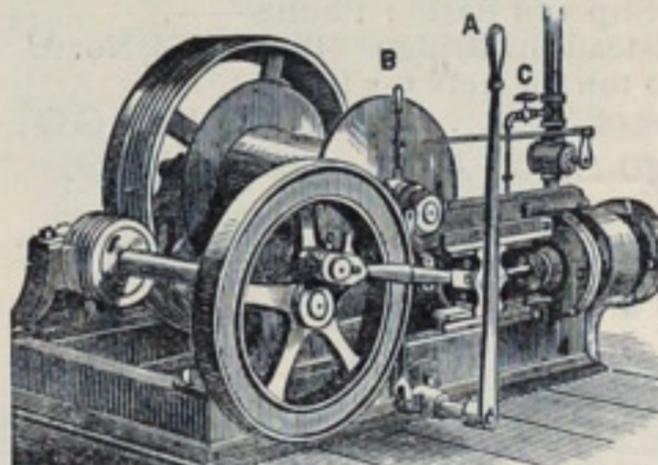
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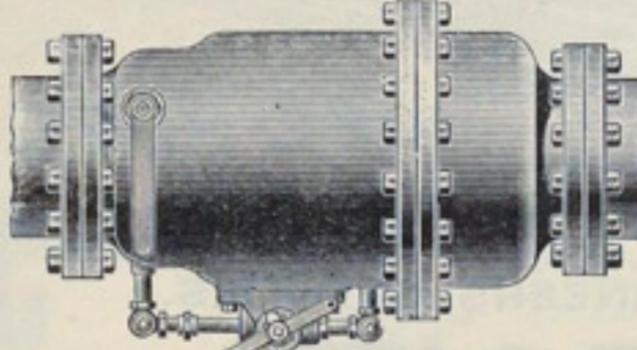


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